A TRUE EXPERIMENTAL STUDY TO ASSESS THE EFFECTIVENESS OF YOGA ON ACADEMIC STRESS BIOCHEMICAL AND BIO PHYSIOLOGICAL PARAMETERS AMONG ADOLESCENTS.

Synopsis

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ABSTRACT

Background

Academic stress is mental distress linked with anticipated frustration or fear of academic failure. In India, 35% of adolescents experience high academic stress, and 37% suffer from high anxiety. This study highlights the importance of introducing yoga in schools to reduce academic stress and promote mental well-being among adolescents.

Aim:

The aim of this study is to evaluate the effectiveness of yoga in reducing academic stress and its impact on biochemical and bio physiological parameters among adolescents.

Methods:

A pretest-post test control group design was used to evaluate the effectiveness of yoga on academic stress, bio physiological, and bio chemical parameters among adolescents aged 16 to 18 years in Trivandrum. The study had two phases: screening phase and intervention phase . Seven schools were selected, with a sample size of 506 participants chosen by u sing proportionate and cluster sampling for the screening phase. For the intervention phase, 50 participants each were randomly assigned to control and experimental groups from the two schools in screening phase. Data collection included a descriptive survey using Dr. Balaji Rao's Academic Stress Scale, a structured socio demographic tool, and for assessments of bio physiological parameters—blood pressure (measured by a calibrated sphygmomanometer), pulse rate (measured manually), and biochemical parameter— salivary cortisol (measured by immunoassay) and these parameters were assessed in both groups before and after the intervention. The experimental group received yoga training thrice in a week for 8 weeks, while the control group received no intervention.

Results

The study results revealed yoga is effective in reducing the Academic stress, bio physiological, bio chemical parameters from the post intervention mean scores 59.6 for Academic stress, 0.724 for salivary cortisol, 123.6 for systolic blood pressure, 80.1 for diastolic blood pressure, 89.8for pulse rate. Highly significant at $p<0.001$ thus rejects the null hypothesis in study group. No statistical significance was found in control group.

Conclusion

The study findings indicate yoga effectively reduces academic stress and promoted mental wellbeing among adolescents . The study recommends importance of regular practice of yoga into schools helps positive health outcome in future .

LIST OF TABLES

Table.No	List of Tables	Page No
4.1	Percentage distribution of level of academic stress among adolescents in screening phase .	17
4.2	Percentage distribution of level of academic stress before and after intervention among experimental group .	18
4.3	Comparison of level of Academic stress before and after Yoga among experimental group	19
4.4	Comparison of biochemical parameter before and after Yoga among experimental group .	19
4.5	Comparison of bio physiological parameter before and after Yoga among experimental group	20
4.6	Comparison of Academic stress before and after Yoga in control and intervention groups.	21
4.7	Comparison of bio chemical parameter before and after Yoga in Control and experimental group .	22
4.8	Comparison of bio physiological parameter before and after Yoga in Control and experimental groups.	22-23
4.9	Academic achievements before and after intervention among experimental group .	24
4.10	Correlation between Academic Stress level and Academic achievement in experimental group.	25

LIST OF ANNEXURES

S.NO	LIST OF ANNEXURES
1	Research Methodology Exam pass certificate
2	Research Methodology Course completion certificate
3	IHEC approval letter
4	CTRI mail approval letter
5	Data Collection Completion letter
6	Published articles
7	Permission letter for the tool used
8	Yoga completion certificate
9	Calibrated certificates of Sphygmomanometer
10 .	Higher Secondary Directorate Certificate

ABBREVATIONS

1. DBP – Diastolic blood Pressure
2. SBP – Systolic Blood pressure
3. N – Number of participants
4. S – Significant

Chapter 1

Introduction

1.1 Background of the study

Adolescents are particularly vulnerable to the problems associated with academic stress as transitions occur at an individual and social level. Students in secondary and tertiary education settings says a wide range of on going normative stressors which can be defined as normal day to day hassles such as on going academic demand .[1]

A study to assess level of academic stress and anxiety from five private secondary schools from Kolkata conducted on 400 students in grades 10 and the results showed 12. 35 % students had high academic stress and 37 % had high anxiety level.[2].

Academic stress has been linked to a variety of negative effects, including ill health, anxiety, depression, and poor academic performance. Travis et al. , discovered a strong link between academic stress and psychological and physical health. [3]

Due to hectic school hours, coaching competition it has become extremely complicated for the students to maintain their physical as well as their psychological health . Students, being children or adolescents, have busy schedules similar to adults. They wake up early for school, attend extra coaching classes to improve their subject knowledge or prepare for competitive exams, and study until late at night to maintain good Academic performance. They do not have enough time, or freedom to enjoy their adolescent life. Additionally, students are often forced by parents or others to choose academic disciplines or make career choices that appear potentially beneficial in the future. However, such forceful career choices can adversely affect an individual's health and well-being. [4]

Now a days yoga has been used as therapeutic intervention . Yoga is one of the finest Indian discipline and integral part of Indian philosophy which is being practiced globally for ages. People widely use yoga for various purposes such as meditation ,to enhance physical and psychological wellbeing to control aggression and stress and other mental health issues . [5]

1.2 Need and Significance of the study

Numerous research studies have presented with yoga as an intervention for academic stress in higher secondary adolescents, . However, there is a notable gap in the literature concerning the impact of yoga on biochemical markers such as cortisol and adrenaline related to academic stress among higher secondary students with yoga . Additionally, existing research knowledge lacks insight into the relationship between academic stress and vagal changes among higher secondary students when practicing yoga. The present study aims to bridge this gap by investigating the effectiveness of yoga on academic stress, as well as its influence on biochemical and biophysiological parameters among adolescents.

1.3 STATEMENT OF PROBLEM

- A true experimental study to assess the effectiveness of yoga on Academic stress , bio chemical and bio physiological parameters among adolescents .

1.4 Aim of the study

- The aim of the study is to assess the effectiveness of yoga on academic stress, bio chemical and bio physiological parameters among adolescents .

1.5 Objectives of the study Primary

objectives

- To estimate level of academic stress among adolescents .
- To assess the efficacy of yoga on academic stress among adolescents in experimental group .

Secondary objectives

- To assess the efficacy of yoga on biochemical parameter among adolescents in experimental group .
- To assess the efficacy of yoga on bio physiological parameters among adolescents in experimental group .
- To study the relationship between academic stress bio physiological and biochemical parameters among adolescents .
- To compare efficacy of yoga on academic stress, bio chemical and bio physiological parameters in experimental and control group .
- To find out the correlation between the academic stress and the academic achievement among experimental group .

1.6 : Research Hypothesis

- H1: There is a significant difference in the mean scores of academic stress, Bio physiological and Bio chemical parameters after implementing yoga among the experimental group.
- H2 : There is a significant difference in academic stress level between the experimental and control group after intervention **.**

1.7 OPERATIONAL DEFINITION

- **True experimental study** : it is a most scientific design where researcher manipulate independent variables (yoga) to see the effect of dependent variables (Academic stress , Bio chemical and Bio physiological variables) to observe the effect on dependent variables in presence of randomisation and control group for comparison
- **Assess :** it is the checking response of Academic stress, Bio chemical and Bio physiological parameter before and after intervention (yoga).
- **Effectiveness** - it measures the quality of yoga provided by the researcher to participants in the experimental group and in the presence of control group for comparison .
- **Yoga :** it involves combination of various physical postures (asanas) and breathing techniques (pranayama), which helps to reduce academic stress and promote mental wellbeing of the participants .
- **Academic stress :** it is stress related to academics experienced by Higher Secondary Adolescents which is assessed by Sri Balaji Rao Academic Stress Scale before and after intervention .

- **Adolescents :** Adolescents who are studying in 11th and 12th standard in a higher secondary school and the age group between 16 and 18 years.
- **Biochemical parameter :** it refers to changes in cortisol hormone level in saliva in response to academic stress before and after yoga .
- **Bio physiological parameters** - it refers to changes in pulse rate , blood pressure , in response to academic stress before and after yoga .

1.8 Assumptions

- The adolescents are in higher secondary section are having high Academic stress .
- Yoga training has positive effect on reducing Academic stress among adolescents .
- The participants receiving yoga training will demonstrate significant reduction in their level of academic stress and improvement in academic achievement .

1.9 Delimitations

- The intervention phase is limited in small sample size resulting in low statistical power .
- Yoga training is provided only thrice (on alternate day) in a week , remaining days subjective assessment was done with log books maintained by participants .
- The duration of yoga is restricted to 45 minutes per day .

1.10 CONCEPTUAL FRAMEWORK

- The study was designed based on the Pender's Health Promotional Model .

Chapter 2

Review of Literature

This chapter deals with the various literature reviewed for the study and the details of the literature are described under various sections as follows:

2 :1 : Studies related to Academic Stress among Adolescents

Sreevani Rentala etal (2019) conducted study on holistic stress management program on academic stress, depression , anxiety , general stress, and improvement in well-being and well-being of Indian adolescent girls at selected colleges of Dharwad city, Karnataka, India .The study was adopted randomized control design . The study finding reveals that after 6 months of follow-up compared to control group, the experimental group participants showed statistically significant decrease in academic stress , depression , anxiety , general stress, and improvement in well-being .[6]

Studies related to yoga on Academic Stress .

Shilpa Singh Rohilla (2022) found beneficial effect of yoga on mental health , Academic stress and life satisfaction among higher secondary adolescents at selected higher secondary schoolsIn Punjab. The study was designed with one pre test post test design. The study findings reveals that after two months of yoga training , mean pre test values of 16.3 ±7.12 and on post test value is11.88 ±6.36 which indicate significant increase level in mental health (p=<0.001)

Similarly mean pre test value and post value of academic stress 11.10 ±9.86 and 4.47 ±5.54 showed significant decrease in academic stress ((p=<0.001) where as mean score of pre test and post test score of life satisfaction is 27.9 ±5.43 and 30.46 ±7.18 respectively which significantly increases life satisfaction (p=<0.001). [7]

Studies related to yoga on biochemical parameter

Fatma Ozlem Ozturk (2021) conducted positive effect of laughter Yoga on mental symptoms related to severe stress and salivary cortisol levels in first-year nursing students at Department of Nursing, Ankara University, Ankara, Turkey .The study adopted randomized controlled trial . The result showed in comparing to control group ,a significant decrease from mean scores of pre test to post test value of Brief Symptom Inventory and salivary Cortisol level after the intervention in experimental group which is statistically significant (p=<0.05). [8]

Studies related to yoga on bio physiological parameter

Dr . K. Bhaskara Raju (2017) , also showed benefits of yoga and pranayama on physiological parameters in Medical students at Department of physiology, Alluri sitaramaraju Academy of Medical Sciences, Eluru, Andhra Pradesh. Physiological parameter i.e. blood pressure, heart rate, respiratory rate and haematological parameters were measured before giving yoga . The study adopted one group pretest post test design . The study findings reveals that there is a significant fall in SBP, DBP, heart rate and ESR after first month, second month and third month of yogic practice and significant raise in hemoglobin percentage, total red blood cell count, total leucocytes and platelets count, vital capacity, FEV1 and PEFR after yogic practices.(9)

2.2 RESEARCH GAP :

- Most of the studies are done with yoga intervention on Academic stress among adolescents but no studies were observed with yoga intervention on academic stress ,Bio chemical and Bio physiological parameter among adolescents .
- The literature review also identifies the lack of review on beneficial effect of yoga on neuro endocrine parameters among Adolescents who are in higher secondary sections .

Chapter 3

Materials and Methods

This chapter deals with the methodological approach of the study .

3.1 Research Approach : A quantitative research approach is adopted for the study .

3.2 Research Design : Basic true experimental design - pre test and post test with control design .

3.3 Variables :

- Dependent variables : Academic stress, Biochemical and Bio physiological parameters .
- Independent variable : yoga

Socio demographic variables : Age, gender, place of residence. education of father and mother, occupation of father and mother, birth order, number of siblings, family monthly income, type of family, recreation activities, physical activities, relationship with peers, sleep duration and use of social media

3.4 Settings of the Study : Selected Higher Secondary Schools , from Government , Aided and private sectors in Thiruvananthapuram district .

3.5 Study population :

Target population : All the Adolescents who are studying in Higher Secondary Schools .

Accessible population : Adolescent who meet inclusion criteria and studying in Higher Secondary Schools age group between 16-18 yrs .

3.6 Sample size calculation/sampling frame: Sample size calculation for descriptive study

The sample size of descriptive phase is 506 samples . The estimated proportion of academic stress is calculated with the reference a study conducted by Gurung M etal on "Academic stress among high school students in rural area of Nepal: it was a descriptive cross sectional study .(Journal ofNepalMedicalassociation2020:58(225).https://doi.org/10.31729/jnma.4978).

$$n = \frac{Z_{\infty}^2\, p(1-p)}{d^2}$$

Where n= Sample size

Z_{∞} = Z statistics for a level of confidence

P = Estimated proportion of an attribute present in the population

d = Level of precision

Present study: -

p = 0.2943 (Proportion of moderate / severe academic stress)

d = 20% of p = 0.0588

Z_{∞} = 1.96 for ∞ = 0.05

$$N = \frac{(1.96)^2 \text{ x } (0.294 \text{ x } 0.706)}{(0.0588)^2}$$

= 230

Design effect = 2

Minimum sample size for the study = 2x230 *(10% Attritions)

Minimum sample size for the study =506

Sample size calculation for intervention phase

The sample size for intervention phase is 50 samples each for intervention and control group .

$$n = \frac{2\sigma^2 \ (Z_{1-\alpha/2}+Z_{1-\beta})^2}{d^2}$$

$$\sigma^2 = \frac{\sigma_1^2 + \sigma_2^2}{2}$$

σ_1= standard deviation of the first sample

σ_2= standard deviation of the second sample

d=μ_1-μ_2=observed difference between the mean values of the two samples

$$\sigma^2 = \frac{\sigma_1^2 + \sigma_2^2}{2}$$

= $8.2^2 + 7.9^2 /2$

= 67.24+62.41/2

= 129.65/2

= 64.83

$(Z_{1-\alpha/2} + Z_{1-\beta})^2 = (1.96 + .842)^2 = (2.802)^2 = 7.86$

N= 2x64.83x 7.86/4.7 ^{2}

= 1019.13/22.1

= 46.1=46 (10 % attrition).Final sample size is 50 .

3.7 Sampling frame :

The study involves a two-phases -Screening phase and Intervention phase . A sample size of 506 students was required for screening phase .Seven schools were selected(three Government, two Aided, and two Unaided)based on proportionate sampling for screening phase. Each selected school contributed two clusters (one from the 11th and one from the 12th grade), ensuring representation from Science, Arts, and Commerce streams. Data was collected from all students present in the selected clusters. A total of 100 participants (50 each in experimental and control groups) were required for interventional phase. Two schools from the descriptive phase were selected using simple random sampling.

3.8 Sampling technique :

During screening phase ,

- Proportionate sampling – for selection of schools
- Cluster sampling - for selection of class rooms
- Stratified sampling .
  - Type of school – I st strata
  - Stream of school – II nd strata
  - Year of studying - IIIrd strat

Intervention phase : Random sampling - for selecting two schools from the descriptive phase .

3.9 Details of Clusters in Screening phase

SL .No	Type of education institution	Name of education institution	Year of Study	Stream of Study
1	Govt schools (3 nos)	Government School Kamaleswaram	Plus I	Science
			Plus II	Arts
		Government School Medical College	Plus I	Arts
			Plus II	Commerce
		Government School kulathukkal	Plus I	Commerce
			Plus II	Science
2	Aided schools (2nos)	1 .St marys Higher Secondary School	Plus I	Science
			Plus II	Arts
		2 . Salvation Army School	Plus I	Commerce
			Plus II	Science
3	Unaided Schools / Private school	1 . Corodova Higher secondary School	Plus 1	Arts
			Plus II	Commerce
		2 . MMHRS Higher Secondary	Plus I	Science
			Plus II	Arts
Total Number			14 clusters	

3.10 DESCRIPTION OF THE TOOL

- **Academic stress scale** : it is a self explanatory standardised scale by Dr Balaji Rao's ,consist of 40 items where each item has 5 responses (No Stress, Slight Stress, Moderate Stress, High Stress and Extreme Stress) with scoring of 0,1,2,3 and 4 respectively. High scores are the indication of high academic stress and low scores are the indication of low academic stress. The total items were 40. Therefore 160(4x40) is the maximum possible score and the highest score on each factor would be 32(4x8). Each factor has equal no. of items. The higher the value of score, the more is the academic stress and vice versa.

- **Salivary Cortisol test** : it is used for Assessing the biochemical parameters such as salivary cortisol was measured by immunoassay "ECLIA" and immunoassay analyzer " COBAS e" Normal value of cortisol saliva <0.874µg/dl (morning hours 6am) .
- **Calibrated Sphygmomanometer:** it is used to assess bio physiological parameter such as Blood pressure .

3:11 Content Validity : The study was discussed and got approval from research advisory committee and . The suggestions was incorporated and later sent for validation from external experts . Content Validity is obtained from 3 experts from nursing discipline,3 experts from psychology department, 1 experts from statistics department ,1 experts from yoga and one medical expert from Community department and another one from psychiatry department .

3.12 Reliability of Tool :

The reliability of Academic stress scale is 0.82 tested using test – retest method . Sphygmomanometer is calibrated by Cyrix Health Care PVT.

3:13 Selection Criteria

Inclusion Criteria

- Participants whose parent's are willing to give consent /Ascent to participant in the study
- Participants who are studying in different types of Higher Secondary schools (Govt ,Aided ,unaided) in various streams such as Science, Arts, Commerce .
- Those who are between the age group 16 yrs to 18 yrs .

Exclusion criteria :

Adolescents who were excluded

- Physically unfit and Mentally Challenged .
- Already taken yoga practice or practicing yoga .
- Practicing similar relaxation exercises like Zuba or Aerobic exercise.

3.15 ETHICAL CONSIDERATION : The study was approved by the Institutional Ethics Committee meeting of Shri Sathya Sai Medical Hospital and Research Centre (IEC N0 :2020/619 dated on 16/10/2020) .The study purpose ,benefits and risks of the study were informed to the study participants as well as their parents and also ensure right to withdrawn from the study . Informed consent were obtained from the students and parents . The study was also registered and approved by the highest regulatory authority CTRI.(CTRI/2022/12/04/047936) .

3.14 Pilot study : The pilot study was conducted during December 2022 to May 2023 in St Antony's Higher Secondary School and NSS Higher secondary School .(10% of main Study) . The Study was found feasible for main study and used tools was found feasible and appropriate .

3:15 Data Collection Procedure :

The details of data collection as follows

Phase 1 - Assessment phase (pre-test)

The data was collected during the period of July 2023 to December 2023 .The participants were screened for academic stress during descriptive phase . 50 participants each were recruited from screening phase for intervention and Control group and subjected for assessment of bio physiological (BP and pulse) and biochemical parameter (Salivary Cortisol) .The BP was monitored by calibrated BP apparatus in sitting position. The cuff of the BP apparatus was placed on left arm while keeping the arm horizontal at the heart level and placed on table. The pulse rate was monitored with help of thumb and index finger and Salivary cortisol was measured with help of immunoassay analyser .The socio demographic variables of the control and experimental groups were found to be homogeneous, .

Phase II - Intervention phase

Yoga practice was provided thrice (alternate day) in a week for 8 weeks with a duration of 45 mts in the morning to intervention group by investigator who has acquired TTC in Yoga and the remaining days participants were practiced by self and maintained a log book . The control group does not receive yoga . The participants who were absent on two consecutive days in yoga training were eliminated from the study and no drop out in both groups were reported during data collection period . Yoga module consists as follows

- Shanti mantra : (3 mt)
- Cooling pranayama : 5mts (Anulomaviloma : (2 rounds) Sithalisikkari : (2 rounds)
- Surya Namaskara: 10mts (6 rounds)
- Shava asana :5 Mts
- Balancing posture : 5 mts Vrikashana , Boojaghashana ,Trikonasana, vijarasna ,
- Backward posture : 5 mts
- Transcendental meditation : 10 mts
- Closing prayer : 2 mts .

Phase III - Evaluation phase (post test) : Post test was conducted among control and experimental groups by assessing academicstress,biophysiological (blood pressure ,pulse rate and biochemical Parameters (salivary cortisol) one week after the intervention (9 th week) .

3.15 Collection of saliva Sample

The participants were instructed to collect 2 ml of saliva in specimen bottle excluding air bubbles in the morning at 6 am . Each student was instructed to be in a relaxed sitting position, with the trunk slightly inclined towards the knees, so that the saliva can flow freely into the collection container. The sample was collected to test tubes later and subjected to centrifuged for free cortisol . The immune analyser ECLIA (Electro Chemiluminescence Immuno Assay) and COBAS were added to sample for assessing cortisol in saliva

3:16 :DATA COLLECTION SCHEDULE : screening phase

	Type of education institution	Name of education institution	Year of Study	Stream of Study	Dates	No of samples
Screening Phase	Government schools (3 nos)	Govt HHS Kamaleswaram	Plus I	Science	04/7/23	100
			Plus II	Arts	12/7/23	
		Govt HHS , Medical college	Plus I	Arts	18/7/23	100
			Plus II	Commerce	22/7/23	
		Govt HHS , kulathukkal	Plus I	Commerce	25/7/23	100
			Plus II	Science	31/7/23	
	Aided schools (2nos)	St Marys Higher Secondary School	Plus I	Science	7/8/23	100
			Plus II	Arts	15/8/23	
		Salvation Army School	Plus I	Commerce	24/8/23	100
			Plus II	Science	30/8/24	
	Unaided schools or private schools (2nos)	Corodova Higher secondary schools	Plus I	Arts	4/9/23	100
			Plus II	Commerce	13/9/23	
		MMHRS higher secondary school	Plus I	science	18/9/23	100
			Plus II	Arts	22/9/23	

Intervention phase

	Name of education institution	Year of Study	Stream of study	Events	Dates
Intervention phase	Salvation Army School (Experimental group)	Plus II	science	Pre test	26/9/23
				Yoga training	2/10/23 to 30/11/23
				Post test	11/12/23
	Govt HHS Kulathukal (control group)	Plus II	science	Pre test	29/9/23
				Post test	13/12/23

3:17: Schematic representation of data Collection procedure : This study was conducted by two phases in Trivandrum .

Screening phase

List of higher Secondary Schools in Trivandrum

⇩

Government Schools -79 nos

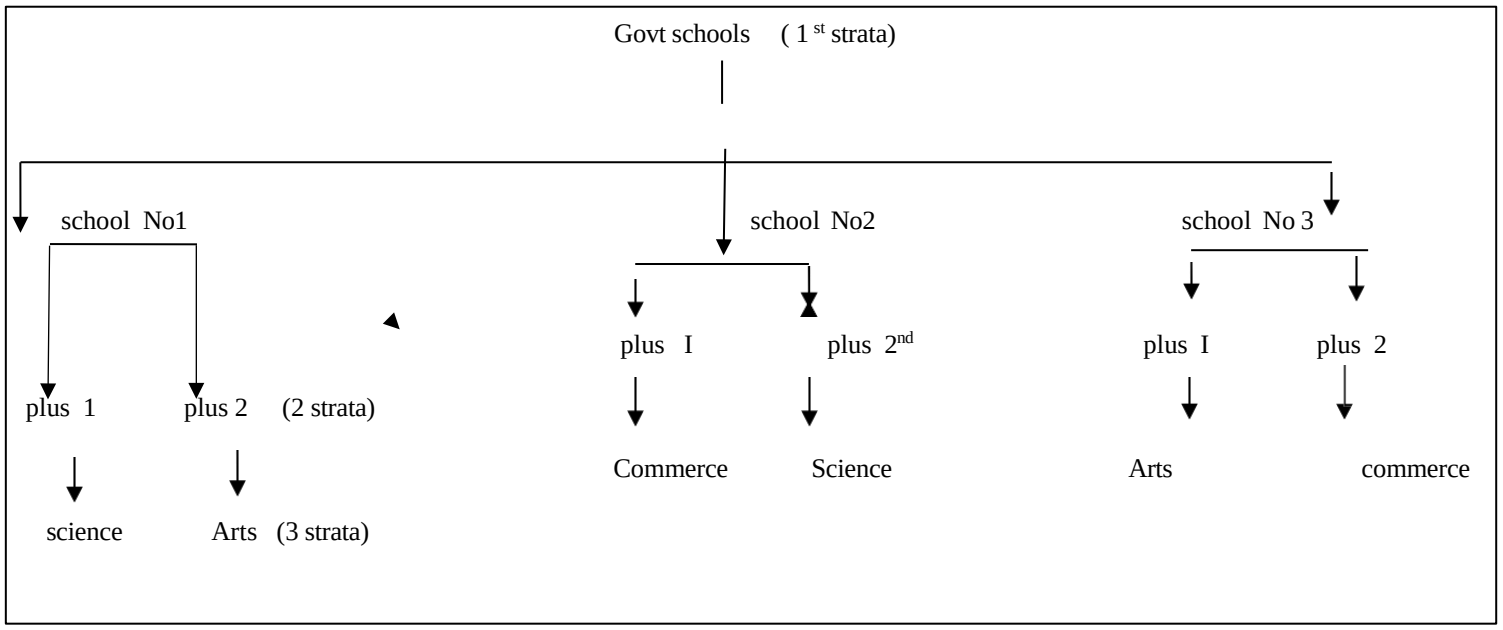
Aided Schools -53 nos ,

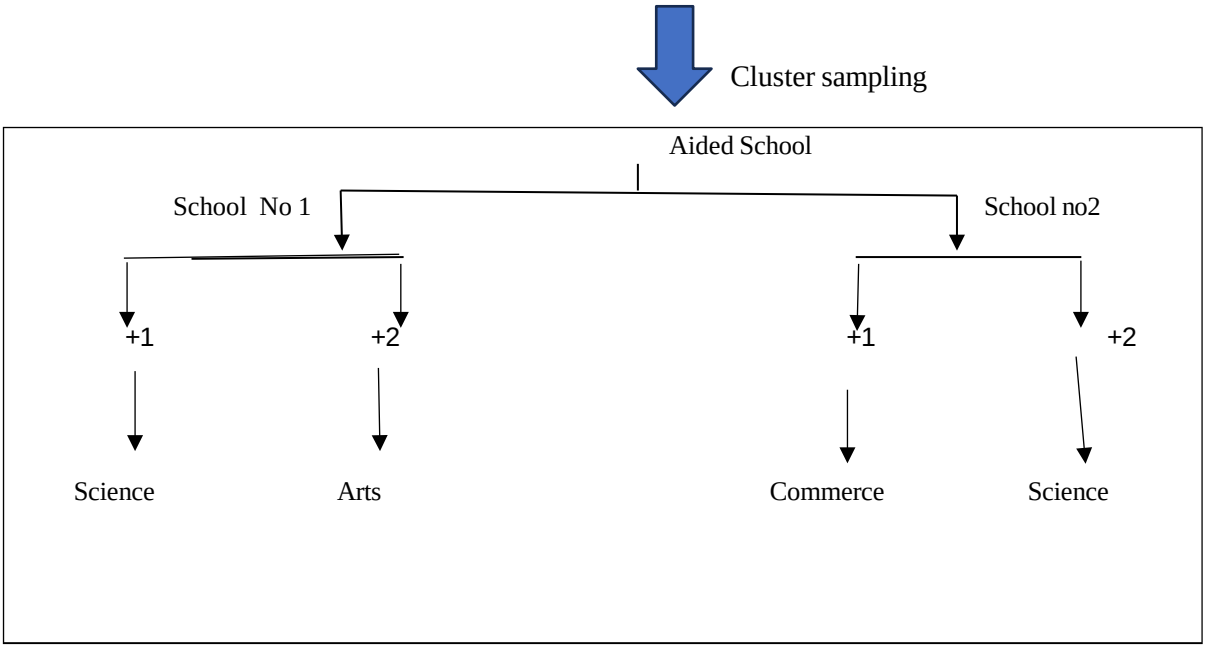
private schools - 41 nos

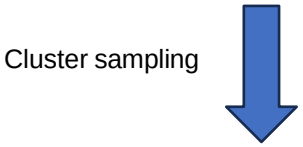
⇩ proportionate sampling

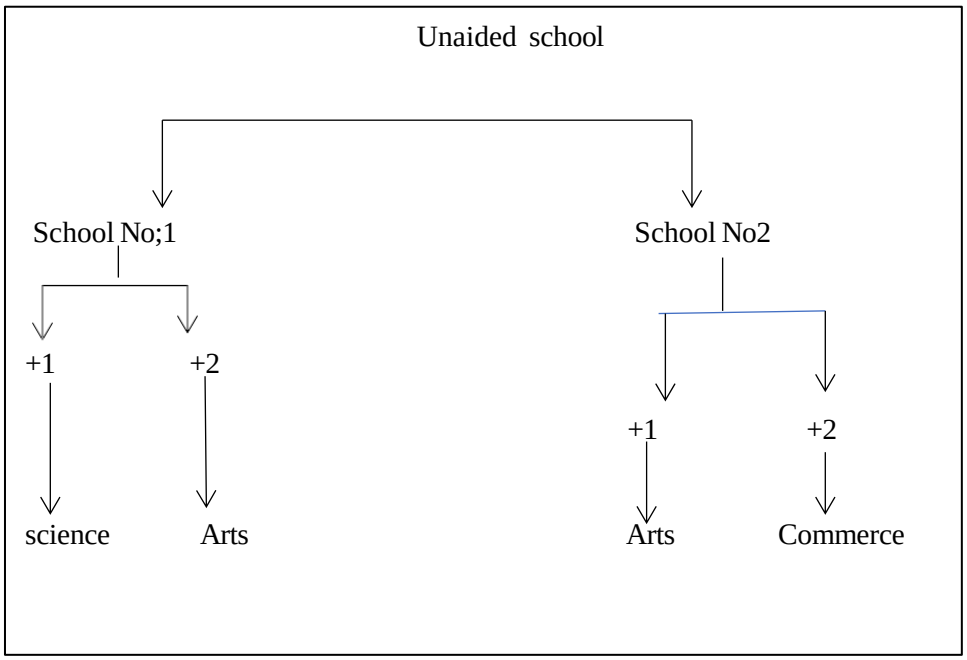
Government Schools -3nos Aided Schools – 2nos unaided schools – 2 nos .

⇩ Cluster sampling

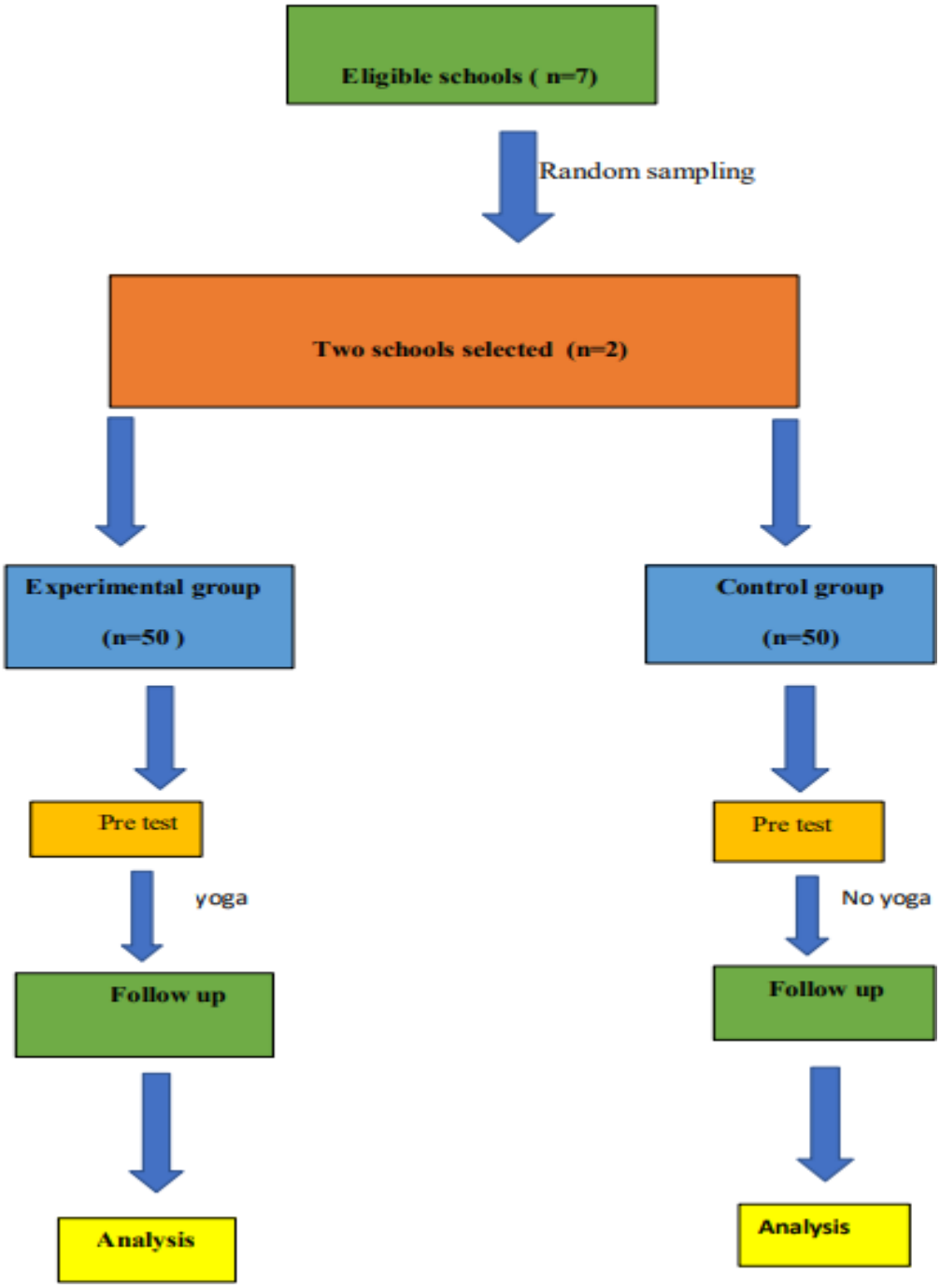



Cluster sampling
Aided School
School No 1
School no2
+1
+2
+1
+2
Science
Arts
Commerce
Science


Cluster sampling


Unaided school
School No;1
School No2
+1
+2
+1
+2
science
Arts
Arts
Commerce

Intervention phase



3:18 Plan For Data Analysis

- To estimate level of stress was expressed in Mean±SD , percentage and frequency .

- To test the effect of intervention paired 't' test is used .
- To find out correlation between academic stress , Bio chemical and Bio physiological parameter Pearson Correlation was computed .
- To find out correlation between academic stress and academic achievements among experimental group, Pearson Correlation was also computed.
- To test the homogeneity of group chi square was used.

Chapter IV

DATA ANALYSIS & INTERPRETATION

This chapter deals with the detailed result analysis of the study. The results have been described under various sections based on the objectives.

4:1 Section A : Distribution of demographic variables of participants with Academic stress

- **Age :** The age distribution of the study group consists of 42% 16-year-old49.6% 17-year-old, and 8.4% 18-year-old. The mean age of the study group was 15.23±6.8 years
- **Gender** :.Regarding gender , 44.1% male and 55.9% female respondents, and no transgender individuals represented in the sample .
- **Year of Study** : According to year of study ,50.3% of respondents in the Plus one year of study and 49.7% in Plus two. In relation to place of residence 56.9 % belong to urban area and 43.1% belong to rural area .
- **Education level of fathers** : Within the surveyed population, the education levels of fathers are as follows: 10% have a professional background, 20% have a graduate degree or higher, 15.4% have completed Higher Secondary Certificate (HSC), 47.3% have obtained a Secondary School Leaving Certificate (SSLC), and 7.3% are categorized as illiterate.
- **Educational Level of Mothers** : Within the surveyed population, the educational levels of mothers are as follows:6.4% have a professional background ,20.6% have a graduate degree or higher ,21.6% have completed Higher Secondary Certificate (HSC) ,43.4% have obtained a Secondary School Leaving Certificate (SSLC) and 8% are categorized as illiterate .
- **Occupational Distribution of Fathers :**The occupational distribution of fathers in the surveyed population as follows ,7.7% work in professional roles,18.1% are private employees,11.9% are government employees,28.6% are engaged in manual labor,25.7% are self-employed,5.1% are unemployed and 2.9% are farmers.

- **Occupational Distribution of Mothers :**The occupational distribution of the surveyed adolescents' mothers shows,6% in professional roles ,18.7% as private employees,6.4% as government employees,8.5% involved in manual labor,14% in self-employment ,45.4% unemployed and 0.9% working as farmers.

- **Birth Order Distribution :**The distribution of children based on birth order is as follows:46.1% are first Birth order ,43.7% are second birth order ,8.1% are third-born and 2.0% have a birth order greater than three.
- **Number of Siblings :**Regarding the number of siblings ,64.6% have one sibling ,29.7% have two siblings and 5.7% have three or more siblings , .
- **Income distribution :**The income distribution among adolescent's family is as follows:47.4% earn less than Rs. 10,000 ,24.3% earn between Rs. 10,000 and Rs. 20,000 ,13.7% earn between Rs. 20,001 and Rs. 30,000 , and 14.6% earn Rs. 30,001 and above .
- **Family Type :The surveyed adolescents belong to different family structures:**71.3% come from nuclear families ,25.4% belong to joint families and 3.3% belong to extended families .
- **Recreational Activities :** Percentage distribution of adolescents based on recreational activities: 38% participate in sports,30.1% are engaged in arts and 31.9% pursue hobbies .
- **Physical Activities :** Regarding physical activity engagement,13.6% participate in swimming, 25.9% engage in walking ,20% take part in dancing and 40.6% are involved in other physical activities.
- **Peer Relationships :**The distribution of adolescents based on their relationship with peers are as follows 78.7% report having a fair relationship ,17.9% report a good relationship and 3.4% report a poor relationship .
- **Sleep Duration ;**The distribution of children based on their sleep duration is as follows as 32.3% sleep for less than 6 hours .54.1% sleep for 6 to 8 hours and 13.6% sleep for more than 8 hours .
- **Social Media Usage** : Regarding social media influence of adolescents ,67.4% use social media almost every day ,19.6% use it often ,5.1% report very frequent usage and 7.9% use it rarely.
- **Type of Educational Institution :**The distribution of adolescents based on the type of educational institution ,28.6% study in government-aided institutions,29% attend private or unaided institutions , and 42.4% are enrolled in government institutions .
- **Stream of Education :**Among the surveyed population of adolescents, streams of education are ,35.7% belongs to science stream ,35.7% pursued arts and 28.5% opted for commerce .
- **Study Habits :**Regarding study habits,45.7% report having regular study habits,47.3% state they have irregular study habits , and 7% indicate having no study habits .
- **Time Management Skills :**Adolescents rated their time management skills as follows:35.1% belongs to fair category ,38.1% are having good time management and 26.4% are poor in managing time .
- **Academic Performance (Last Grade Achieved) :**The distribution of adolescents based on academic performance,43% achieved an A+ grade,33% received a B grade,22.4% obtained a C grade and1.6% scored a D grade .

Table No :4:1

Percentage distribution of level of academic stress among adolescents in screening phase

N=700

Academic Stress	Frequency (n)	Percentage (%)	95%CI
No stress	0	0	
slight stress	184	26.3	23.1-29.7
Moderate stress	255	36.4	32.9-40.1
High stress	261	37.3	34.4-41.7
Extreme stress	0	0	
Total	700	100	
Mean	63.3		
SD	27.0		

The table delineates adolescents' levels of academic stress, with 26.3% experiencing slight stress, 36.4% facing moderate stress, and 37.3% enduring high stress. There are no reported instances of no stress or extreme stress among the respondents.

Table No :4:

Percentage distribution of level of academic stress before and after intervention among experimental group

N=50

Academic stress	Before intervention		After intervention	
	Frequency	percentage	Frequency	Percentage
Extreme stress	0	0	0	0
High stress	37	74	6	12
Moderate stress	9	18	18	36
light Stress	4	8	26	52
No stress	0	0	0	0
Total	50	100	50	100

The findings indicate a significant reduction in stress levels following the intervention. Before intervention . a majority of students (74%) experienced high stress levels ,moderate stress was reported by 18% of participants ,Only 8% of students experienced slight stress levels and no students reported extreme stress or being completely stress-free. After the Intervention ,the percentage of students experiencing high stress dropped drastically from 74% to just 12% ,the number of students reporting moderate stress doubled,

increasing from 18% to 36%,Slight stress became the most common category, rising from 8% to 52%, indicating a shift toward lower stress levels and No students reported extreme stress or an absence of stress in either phase of the study.

Table No : 4:3

Comparison of level of Academic stress before and after Yoga among experimental group

N =50

Academic stress in experimental group	Baseline		9 th week		Std -Error mean		Paired t test	
	mean	SD	mean	SD	Baseline	9 th week	t	p
	96.1	15.84	59.6	14.48	2.24	2.047	26.9	*<0.001 S

*S - significant

At the baseline, the mean academic stress score was 96.1 with a standard deviation (SD) of 15.84. After nine weeks, the mean stress score decreased to 59.6, with an SD of 14.48. The standard error of the mean at baseline was 2.24, and at the ninth week, it was 2.047. A paired t-test was performed to analyse the difference between baseline and ninth-week stress levels, yielding a t-value of 26.9 and a p-value of <0.001. Since the p-value is highly significant, it indicates a statistically significant reduction in academic stress over the nine-week peri

Table No : 4:4

Comparison of biochemical parameter before and after Yoga among experimental group

N=50

Salivary Cortisol in experimental group	Baseline		9 th week		Paired difference		Paired t test	
	mean	SD	mean	SD	Mean	SD	t	p
	1.118	0.189	0.724	0.180	0.394	0.2259	12.335	<0.001 Significant

.This table illustrates salivary cortisol level in intervention group between baseline and 9 th week following intervention . There is a significant difference in pre intervention mean scores from baseline1.118 to 0.724 at 9 th week which is highly significant (<0.001) . This indicate yoga is effective to reduce academic stress.

Table No :4.5

Comparison of bio physiological parameter before and after Yoga among experimental group .

N=50

Biophysiological parameters	aseline		9 th week		Paired difference		Paired test	
Systolic Blood pressure	Mean	SD	Mean	SD	Mean	SD	t	p
	128.7	6.0	123.6	4.4	5.04	5.99	5.95	*<0.001 significant
Diastolic Blood pressure	82.7	4.7	80.1	4.0	2.6	4.8	3.839	*<0.001 Significant
Pulse rate	93.7	12.2	89.8	7.1	3.82	9.862	2.739	*<0.001 Significant

This table depicts the comparison of bio physiological parameters in experimental group between baseline and 9 th week . There is significant decrease in SBP from pre interventional score (Mean =128.7)at baseline to post interventional score (Mean = 123.6) at 9 th week which is statistictically significant (<0.001) . similarly there is significant decrease in DBP from pre interventional mean (M=82.7) at base line to post interventional mean (M=80.1) at 9 th week which is highly significant (p=<0.001). The mean value of pulse at baseline (M=93.7) is reduced to M = 89.8 at 9 th week following intervention . The changes in mean value is significant (p=<0.001) which indicate intervention is effective .

Relationship between academic stress, bio physiological and biochemical parameters among adolescents .

- There is a significant positive correlation between Academic stress and Salivary cortisol (Pearson's r = 0.504, p < 0.01) and the coefficient determination is given by r square which is 0.254 or 25.4%.
- There is significant positive correlations between Academic stress and Pulse (Pearson's r = 0.513, p < 0.01). Coefficient of determination is 0.2632.
- There is significant positive correlations between academic stress and systolic blood pressure (Pearson's r = 0.543, p < 0.01) and Coefficient of determination is 0.2949. This indicates a moderate positive linear relationship between these two variables among adolescents.
- There is significant positive correlations between academic stress and diastolic blood pressure (Pearson's r = 0.436, p < 0.01)and Coefficient of determination is 0.1900. This indicates a moderate positive linear relationship between these two variables among adolescents .

Table No 4.6

Comparison of Academic stress before and after Yoga among control and intervention group.

N =100

Academic stress	Control group		Intervention group		Between group comparison	
	mean	SD	mean	SD	t	p
Baseline	83.6	20.7	84.1	15.8	0.125	0.901(No significant)
9th week	83.3	18.2	59.6	14.5	7.199	*<0.001 (significant)
Change in Stress	0.36	11.08	24.50	9.56	11.662	*<0.001 (significant)

The average academic stress score at baseline among the control group and intervention group were 83.6 ± 20.7 and 84.1 ± 15.8 respectively and it was no significant difference in the average academic score between control and experimental group at baseline . But the academic stress Score was significantly reduced after intervention at 9 th week (SD=15.8) in experimental group than in control group (SD= 18.2) which is statistically significant(p=<0.001).

Table No:4:7

Comparison of bio chemical parameter before and after Yoga among Control and experimental group N=100

Salivary cortisol	Control group		Intervention group		Between group intervention	
	mean	SD	mean	SD	t	p
Baseline	1.190	0.350	1.118	0.189	1.279	0.204 (No Significant)
9th week	1.110	0.426	0.724	0.180	5.903	*<0.001 (Significant)
Change in Salivary cortisol	0.078	0.318	0.394	0.229	5.698	*<0.001 (Significant)

In comparing salivary cortisol levels between interventional and experimental group , the intervention group exhibited a significant decrease from baseline(SD =0.189) to the 9th week (SD=0.180) the control group ,which is statistically significant (p= <0.001) .

Table No:4:8

Comparison of bio physiological parameter before and after Yoga among Control and experimental group .

N=100

SBP	Control group		Intervention group		Between group comparison	
	mean	SD	mean	SD	t	p
Baseline	127.0	6.0	128.7	8.5	1.15	0.253 (No significant)
9th week	126.3	5.5	123.6	4.4	2.71	*0.008 (significant)
Change in SBP	0.64	2.66	5.04	5.99	4.746	*<0.001 (Significant)

DBP	Control group		Intervention gro p		Between group intervention	
	mean	SD	mean	SD	t	p
Baseline	81.80	3.86	82.72	4.71	1.068	0.288 (No significant)
9th week	81.3	3.27	80.12	4.01	1.64	* 0.104 (Significant)
Change in DBP	0.48	2.20	2.60	4.79	2.845	*0.005 significant

Pulse	Control group		Intervention group		Between group intervention	
	mean	SD	mean	SD	t	p
Baseline	92.8	11.2	93.7	12.2	0.359	0.720 No Significant
9th week	92.1	10.7	89.8	7.1	1.252	0.214 No significant
Change in Pulse	0.70	3.11	3.82	9.86	2.134	0.35 (significant)

- In the study involving control and intervention groups, the comparison of systolic blood pressure (SBP) revealed no significant difference between groups at baseline (Control: mean = 127.0, SD = 6.0; Intervention: mean = 128.7, SD = 8.5; t = 1.15, p = 0.253). However, by the 9th week, the intervention group showed a significant decrease in SBP (mean = 123.6, SD = 4.4) compared to the control group (mean = 126.3, SD = 5.5), with a significant between-group difference (t = 2.71, p = 0.008).)

- In the comparison between control and intervention groups regarding diastolic blood pressure (DBP), there was no significant difference at baseline (Control: mean = 81.80, SD = 3.86; Intervention: mean = 82.72, SD = 4.71; t = 1.068, p = 0.288). By the 9th week, although the intervention group showed a lower mean DBP (mean = 80.12, SD = 4.01) compared to the control group (mean = 81.32, SD = 3.27), the difference was not statistically significant (t = 1.64, p = 0.104).
- In the comparison between control and intervention groups regarding pulse rate, there was no significant difference at baseline (Control: mean = 92.8, SD = 11.2; Intervention: mean = 93.7, SD = 12.2; t = 0.359, p = 0.720). By the 9th week, though the intervention group showed a lower mean pulse rate (mean = 89.8, SD = 7.1) compared to the control group (mean = 92.1, SD = 10.7), the difference was not statistically significant (t = 1.252, p = 0.214). However, the change in pulse rate from baseline to the 9th week was significantly higher in the intervention group (mean change = 3.82, SD = 9.86) compared to the control group (mean change = 0.70, SD = 3.11), with a significant between-group difference (t = 2.134, p = 0.035).

Table No : 4:9

Academic achievements before and after intervention among experimental group

N=50

Academic Achievement (Grades)	Before intervention		After intervention	
	frequency	percentage	frequency	percentage
A+	3	6	12	24
A	11	9	12	24
B	9	18	11	22
B+	13	26	10	20
C+	6	12	3	6
C	3	6	1	2
D	3	6	1	2
D+	1	2	0	0
E	1	2	0	0
Total	50	100	50	100

- **Improvement in Higher Grades:** The number of students achieving an A+ increased from 3 (6%) before the intervention to 12 (24%) after the intervention. Similarly, students with an A grade increased from 11 (22%) to 12 (24%). There was an increase of 2 students (4 percentage points) in the B grade category after the intervention. Conversely, the B+ grade category saw a decrease of 3 students (6 percentage points) post-intervention.
- **Reduction in Lower Grades:** students with a C+ grade before intervention decreased from 6 (12%) to 3 (6%) after intervention, and those with a C grade decreased from 3 (6%) to 1 (2%).
- **Elimination of Lowest Grades:** Grades D+, D, and E were eliminated after the intervention, indicating that no students remained in these lowest categories post-intervention. There is a notable increase in the number of students attaining higher grades (A+ and A) and a corresponding decrease in students with lower grades (C+ and below). This suggests that the intervention was

effective in enhancing overall student performance.

Table No : 4: 10

Comparison of Academic Achievement before and after intervention among experimental group

N =50

Academic Achievement	Mean	Std. Deviation	Std. Error Mean	**t**	**p**
Grades before intervention	65.7000	17.92644	2.53518	10.5	<0.001 Significant
Grades After intervention	73.2800	16.30455	2.30581		

The average mean score increased from 65.70 before the intervention to 73.28 after the intervention, indicating an improvement in academic performance .The standard deviation decreased from 17.93 before intervention to 16.30 during post test , suggesting a slight reduction in the variability of scores after the intervention, which is statistically significant (p=<0.001). This indicate that a statistically significant improvement in academic performance following the intervention .

Table No :4:11

Correlation between Academic Stress level and Academic achievement in experimental group.

		Stress	Achievement
Stress	Pearson Correlation	1	-.305*
	Sig. (2-tailed)		.032
	N	50	50
Achievement	Pearson Correlation	-.305*	1
	Sig. (2-tailed)	.032	
	N	50	50

Correlation is significant at the 0.05 level(2-tailed).

Pearson Correlation (sig 2 tailed) test was used to find out the correlation between academic stress level and academic achievement and the result showed that there is a statistically significant negative correlation between stress levels and academic achievement. This suggests that higher stress levels are associated with lower academic performance among the adolescents. The findings highlight the importance of stress management interventions, as reducing stress could potentially improve academic outcomes.

Chapter 5

Discussion

The chapter deals with the discussion of the present study results with the similar studies done accordingly to the objectives.

Objectives :

5.1 Estimate the level of academic stress among adolescents.

In the present study, 8% (4nos)of adolescents experienced slight stress, while 18%(9nos) experienced moderate stress, and 74%(37nos) experienced high stress levels. Notably, there were no adolescents reporting extreme stress or no stress. The changes in the mean score and SD value from baseline (pretest) to 9 th week (post test) indicate statistically significant (p=<0.001).

Studies conducted post- 2000 have shown a wide range in the prevalence of stress among Indian adolescents, varying from 13% to 45% (Talwar R and Kumar V) .[15]

5.2 Efficacy of yoga on academic stress among adolescents in experimental group.

The mean stress score was 84.1±15.8 in the experimental group which was decreased to 59.6± during post week, showing a highly significant result ($p < 0.001$), indicating a substantial reduction in stress levels after the intervention. The study by Das R (2019) also demonstrates the effect of yoga module. It was found that students who participated in yoga module outperformed than the students who did not participate in the module in their overall academic performance.[16]

5.3 Efficacy of yoga on biochemical parameters among adolescents in experimental group.

The mean salivary cortisol level in the experimental group showed a significant decline following the intervention. The mean value was 1.118 ±0.189 before yoga intervention and was 0.724 ±0.180 during the ninth week follow up. This shows that yoga is effective reducing academic stress . The beneficial effect of yoga was also demonstrated by Lee and Lee (2020) who conducted a quasi-experimental, non-equivalent, control-group, and pre-test/ post-test study on fourth year student nurses. The intervention used was laughter therapy. In the experimental group, the mean cortisol level was 0.91 ± 0.74 before intervention and was declined to 0.61 ± 0.05 following intervention. In the control group the corresponding mean values were 0.88 ± 0.68 and 1.21 ± 0.75 respectively.([17]

5.4 Efficacy of yoga on bio physiological parameters among adolescents in experimental group

The results revealed a notable decrease in systolic blood pressure (SBP), diastolic blood pressure (DBP), and pulse rate following the intervention. Prior to the intervention, SBP was recorded as 128.7 ± 6.0, which decreased to 123.6 ± 4.4 at the 9 th week(post test). Similarly, DBP decreased significantly from 82.7 ± 4.7 pre-intervention to 80.1 ± 4.0 post-intervention. Pulse rate also exhibited a decline, with pre-intervention levels at 93.7 ± 12.2 reduced to 89.8 ± 7.1 after the intervention. This effect of intervention was also demonstrated by a number of studies pertaining to adolescents.

A study by Kant and Mastram (2015) had similar results. Subjects were 30 male students in the age range 16-18 years. The mean pulse rate was 63 which was declined to 55.7 following yoga intervention. SBP declined from 122.4 to 119.6 and DBP from 85.5 to 80.9 following the intervention.[18]

5.5 Relationship between academic stress , bio physiological and biochemical parameter among adolescents .

The current study findings reveals that there is a significant positive correlation between Academic stress and both parameters ,Salivary cortisol (Pearson's $r = 0.504$, $p < 0.01$) and Pulse (Pearson's $r = 0.513$, $p < 0.01$). But there is a moderate positive linear relationship between Academic stress and biophysiological parameter (SBP and DBP). Pearson rank Correlation of SBP is Pearson's $r = 0.543$, $p < 0.01$ and DBP is Pearson's $r = 0.436$, $p < 0.01$.

Study by Pujitha Kunatil etal , (2023) showed the before meditation, the pulse rate among participants were 78.5±4.39 were reduced to 75.38 ± 3.037 after six months of Heartfulness meditation . Similarly respiratory rate were changed from 13.93± 1.50 to 12.91± 1.01 after intervention . The pre intervention value of SBP 116.166 ±3.42 reduced in post intervention value 112.36±3.36 . The DBP has change from 76.83 ±3.13 to 72.06± 2.827 . The cortisol level among participants were 11.52± 4.53 before intervention

were reduced to 8.06± 2.38 after practice . [19]

5.6 Comparison of efficacy of yoga on Academic stress , biochemical and Bio physiological parameters among experimental and control group.

The study depicted remarkable decrease in Academic stress , Biochemical and Bio physiological parameter among experimental group following 9th week after practicing yoga than control group . This shows yoga has impact on reducing academic stress and helps to control bio chemical parameters and cardiovascular parameters .

Another study by Singh KP (2018) , the study findings revealed means and SDs of combined academic performance gain scores of three subjects among yoga group is found to be greater than that of the control group among school students and each group were recruited as 100 participants . Further it showed , F-ratio for the difference between means of experimental group (yoga) and control group on the scores of combined academic performance (in Mathematics, Science, and Social Studies) is found to be significant at the 0.01 level of confidence, which indicates that students of the experimental group and the control group differ on the gain scores of academic performance. The study may be concluded from the finding of the study that with the intervention of yoga, academic performance improves by optimizing the stress levels.[20]

5:7 Comparison of academic achievements before and after intervention among experimental group .

The current study reveals that there was an improvement in Higher grade A+ and A after the intervention among the experimental group . Similarly an increase of 2 students (4 percentage points) in the B grade category after the intervention. Conversely, the B+ grade category find a decrease of 3 students (6 percentage points) in post-intervention. There was a reduction in lower grade C+ after intervention and elimination of lowest Grades, Grades D+, D, and E were eliminated after the intervention. The average mean score increased from 65.70 before the intervention to 73.28 after the intervention, indicating an improvement in academic performance .The standard deviation of pre interventional values decreased from 17.93 to 16.30 during interventional value , suggesting a slight reduction in the variability of scores after the intervention, which is statistically significant ($p=<0.001$). This indicate that a statistically significant improvement in academic performance following the intervention .

A study conducted by Dr Akash Ranjan etal on 60 higher secondary students in Assam The mean and standard deviation of pre test scores of experimental and control group 44.03 ± 5.129 and 38.43± 7.90 respectively and there were no significant difference in pre-test scores of Academic Achievement between Experimental group and Control group before performing Yoga Nidra practices. But after 30 week of intervention , the post scores of experimental and control group were 57.10± 5.659 and 51.70± 5.260 which statistically significant at level of $P > 0.5$.[21]

5:8 Correlation between Academic Stress level and Academic achievement in experimental group.

Pearson Correlation (sig 2 tailed) test was used to find out the correlation between academic stress level and academic achievement and the result showed that there is a statistically significant negative correlation between stress levels and academic achievement . This suggests that higher stress levels are associated with lower academic performance among the adolescents.

Across sectional study conducted by Kaphle, Maheshor etal (2024) on 268 health science students in Kathmandu. The result showed a total of 31.7% and 35.4% of respondents had moderate and high academic stress, respectively. The correlation between academic achievement and academic stress was found to be negative ($r = -0.201$ and $P = 0.001$), but statistically significant. The association between sex ($P = 0.008$), academic environment at home ($P = 0.041$), teaching–learning materials at home ($P = 0.022$), and academic stress was found to be statistically significant. [22]

Chapter VI

SUMMARY AND CONCLUSION

This chapter deals with Summary , Conclusion , Recommendation of the study in the field of yoga and also presents the recommendations for further research .

Findings of the study

- Most of the adolescents have Moderate and High level of Academic stress .
- The mean academic stress decreased at baseline to at the 9th week, as indicated by the paired t-test

with a calculated t-value of 18.113 ($p < 0.001$) among experimental group .

- There is a significant reduction in pre intervention mean scores of bio chemical parameter from baseline to at 9 th week (post test)which is highly significant (<0.001) among experimental group .
- There is a significant reduction in pre intervention mean scores of bio physiological parameter from baseline to at 9 th week which is highly significant (<0.001) among experimental group .
- There is a significant positive correlation between Academic stress ,Salivary cortisol , diastolic pressure , Systolic pressure ,pulse rate .
- There is a significant reduction in Academic stress , Bio chemical and Bio physiological parameters following intervention in in experimental group than control group .
- This study findings indicate Yoga is effective to reduce academic stress and controlling bio chemical and cardiovascular parameters among adolescents .
- This study finding reveals that yoga helps to improve the Academic Achievement among Higher secondary session .

Conclusion :

To be concluded , the study findings emphasize importance of practicing yoga , as a stress reliving measures which is essential for reducing academic stress and controlling Bio chemical and Bio physiological stressors among adolescents . Yoga also helped to reduce the academic stress and improved the Academic performance among the adolescents .

Nursing Implications :

Nursing research ;

- A similar study can be conducted on a long-term basis to examine the benefits of regular yoga practice during adolescence, which could positively influence future health outcomes.

Nursing administration

- School Health Nurse can ensure that yoga is accessible to adolescents to meet the specific needs of students who experience anxiety, academic stress, or other health issues.

Nursing practice

- School Health Nurses can introduce yoga programs into the school thereby they can track the impact of yoga on student's health by monitoring improvements in physical fitness, mental health, and academic performance over time.

Nursing Education

- By integrating yoga training in nursing curriculum helps the nursing student to train yoga and impart basic practices to patient for managing anxiety, pain, or chronic conditions.

Limitations :

- Yoga training is provided to participants for a short duration, so the benefits they receive are temporary.
- In the screening phase, stress parameters, such as academic stress, were assessed using subjective data from the participants.
- Salivary cortisol is a good stress biomarker, but errors in sample collection (frothy saliva) which may affect the findings.

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List of Annexures

SRI BALAJI VIDYAPEETH
Examinations

OFFICE OF THE CONTROLLER OF EXAMINATIONS
Dr. **S. SRIRANGARAJ**
Controller of Examinations

Date: 14-03-2022

No. SBV/COE/Ph.D/Feb-22/A5

UNIVERSITY MEMORANDUM

Sub : Sri Balaji Vidyapeeth – Ph.D Degree in Part – I Methodology Written Examination - February 2022 – Results Notified.

* * * * *

Mr/Mrs/Dr. **RENU S, UIN. 1905002007** Research Scholar in Nursing (Part Time - External) is declared to have passed the Ph.D Part-I – Methodology Examination held in February 2022 and he/she is permitted to continue the research under the guidance of Dr. **HELEN SHAJI** and submit the thesis for the award of Ph.D Degree as per the regulations of SBV.

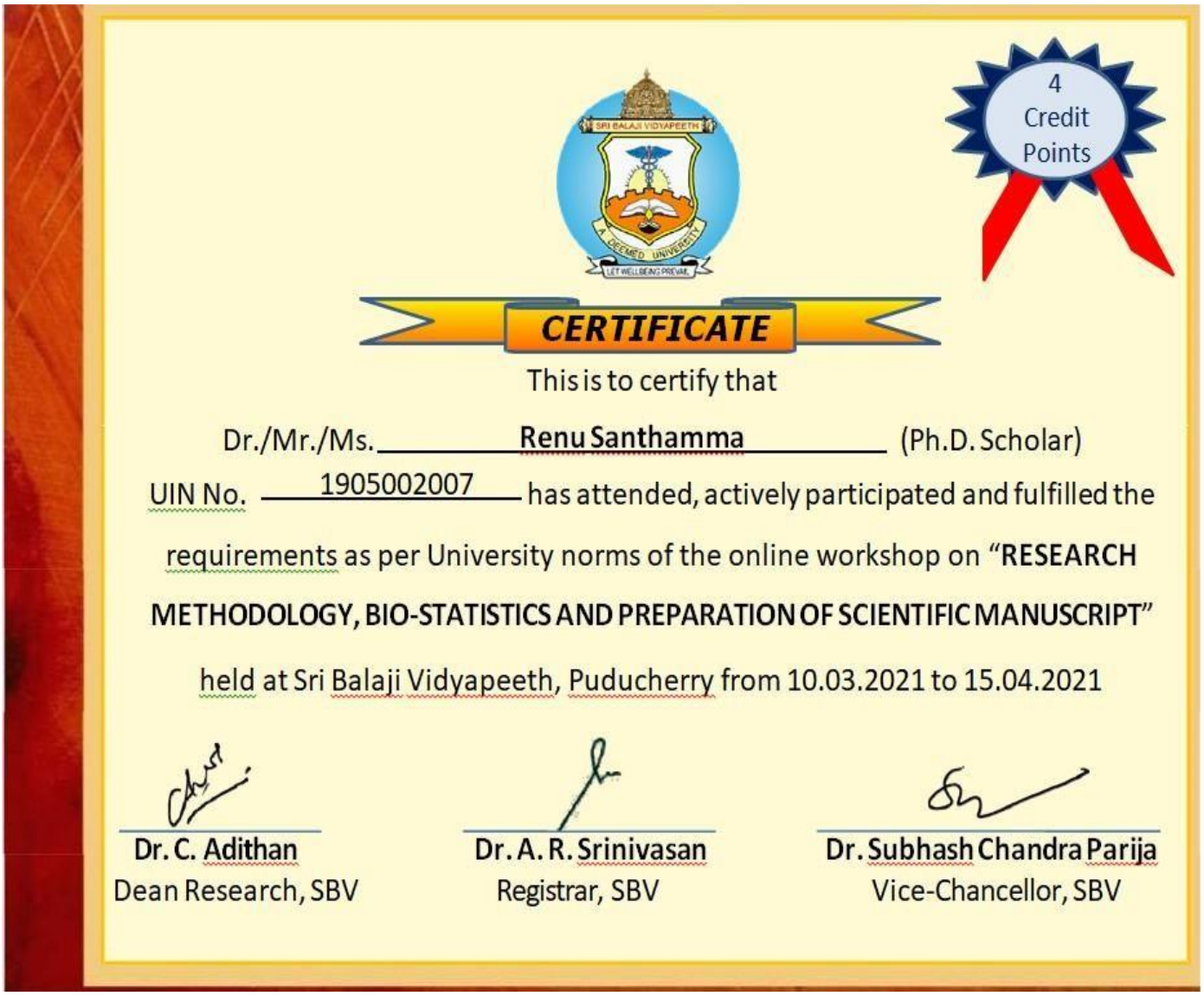
Sl. No.	Subjects	Result Status
1	PAPER - I RESEARCH METHODOLOGY AND PROTOCOL	**PASS**
2	PAPER - II ON CHOSEN FIELD OF RESEARCH	**PASS**

S. Sivarangaraj
CONTROLLER OF EXAMINATIONS

To : Mr/Mrs/Dr. **RENU S** through the Guide, SSSCON

Through : Dr. HELEN SHAJI, The Principal, SSSCON

CC : The Guide.



4 Credit Points

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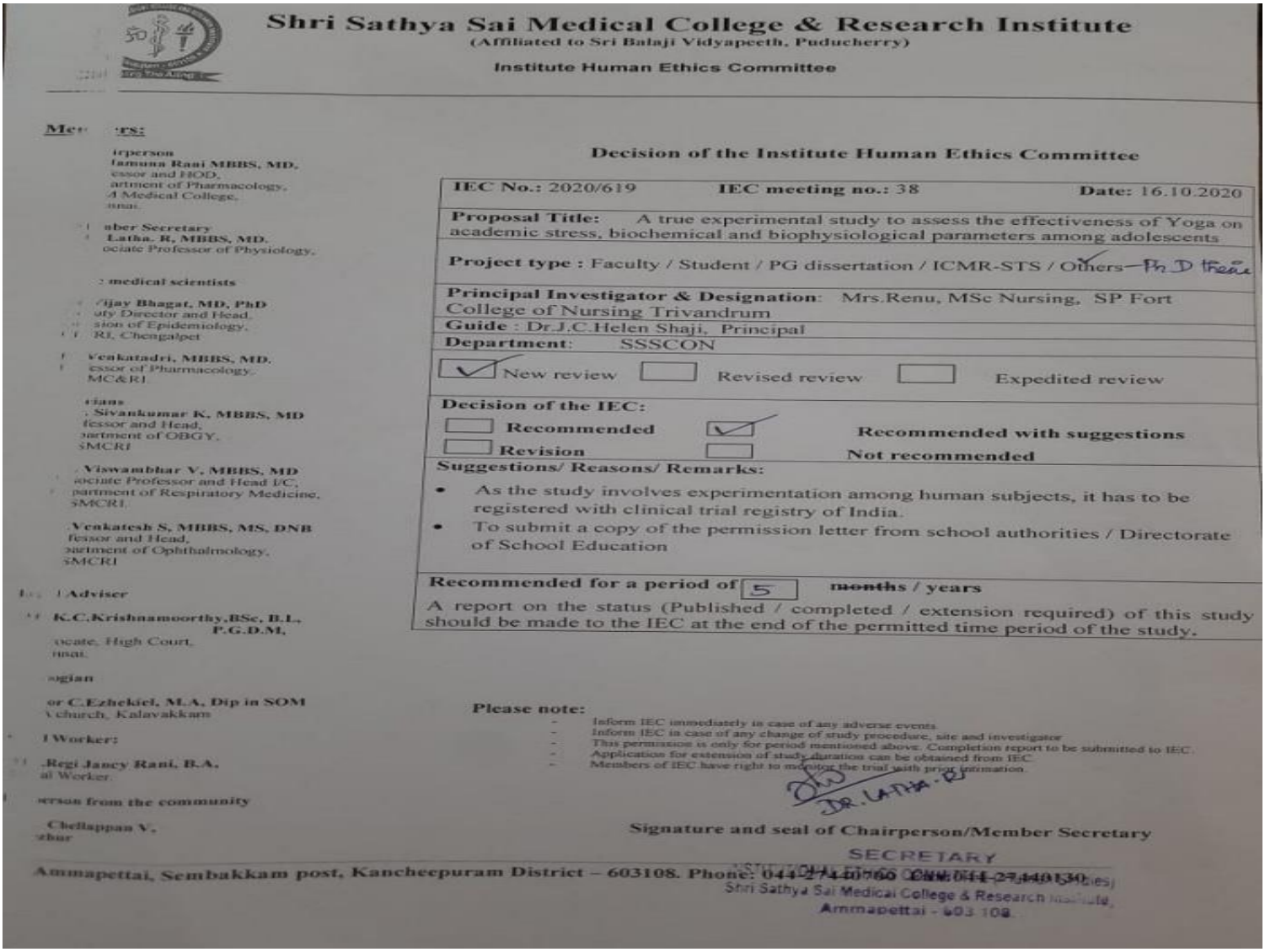
This is to certify that

Dr./Mr./Ms. Renu Santhamma (Ph.D. Scholar)

UIN No. 1905002007 has attended, actively participated and fulfilled the requirements as per University norms of the online workshop on "**RESEARCH METHODOLOGY, BIO-STATISTICS AND PREPARATION OF SCIENTIFIC MANUSCRIPT**"

held at Sri Balaji Vidyapeeth, Puducherry from 10.03.2021 to 15.04.2021

Dr. C. Adithan	Dr. A. R. Srinivasan	Dr. Subhash Chandra Parija
Dean Research, SBV	Registrar, SBV	Vice-Chancellor, SBV



Shri Sathya Sai Medical College & Research Institute
(Affiliated to Sri Balaji Vidyapeeth, Puducherry)
Institute Human Ethics Committee

Me: ES:

irperson
lamuna Rani MBBS, MD,
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artment of Pharmacology,
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Latha. R, MBBS, MD,
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medical scientists

Vijay Bhagat, MD, PhD
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Venkatadri, MBBS, MD.
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Venkatesh S, MBBS, MS, DNB
fessor and Head,
artment of Ophthalmology,
SMCRI

Adviser

K.C.Krishnamoorthy,BSc, B.L., P.G.D.M,
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Decision of the Institute Human Ethics Committee

IEC No.: 2020/619 **IEC meeting no.:** 38 **Date:** 16.10.2020

Proposal Title: A true experimental study to assess the effectiveness of Yoga on academic stress, biochemical and biophysiological parameters among adolescents

Project type : Faculty / Student / PG dissertation / ICMR-STS / Others — Ph D thesis

Principal Investigator & Designation: Mrs.Renu, MSc Nursing, SP Fort College of Nursing Trivandrum

Guide : Dr.J.C.Helen Shaji, Principal

Department: SSSCON

☑ New review ☐ Revised review ☐ Expedited review

Decision of the IEC:

☐ **Recommended** ☑ **Recommended with suggestions**

☐ **Revision** ☐ **Not recommended**

Suggestions/ Reasons/ Remarks:

- As the study involves experimentation among human subjects, it has to be registered with clinical trial registry of India.
- To submit a copy of the permission letter from school authorities / Directorate of School Education

Recommended for a period of 5 **~~months~~ / years**

A report on the status (Published / completed / extension required) of this study should be made to the IEC at the end of the permitted time period of the study.

Please note:

- Inform IEC immediately in case of any adverse events.
- Inform IEC in case of any change of study procedure, site and investigator.
- This permission is only for period mentioned above. Completion report to be submitted to IEC.
- Application for extension of study duration can be obtained from IEC.
- Members of IEC have right to monitor the trial with prior intimation.

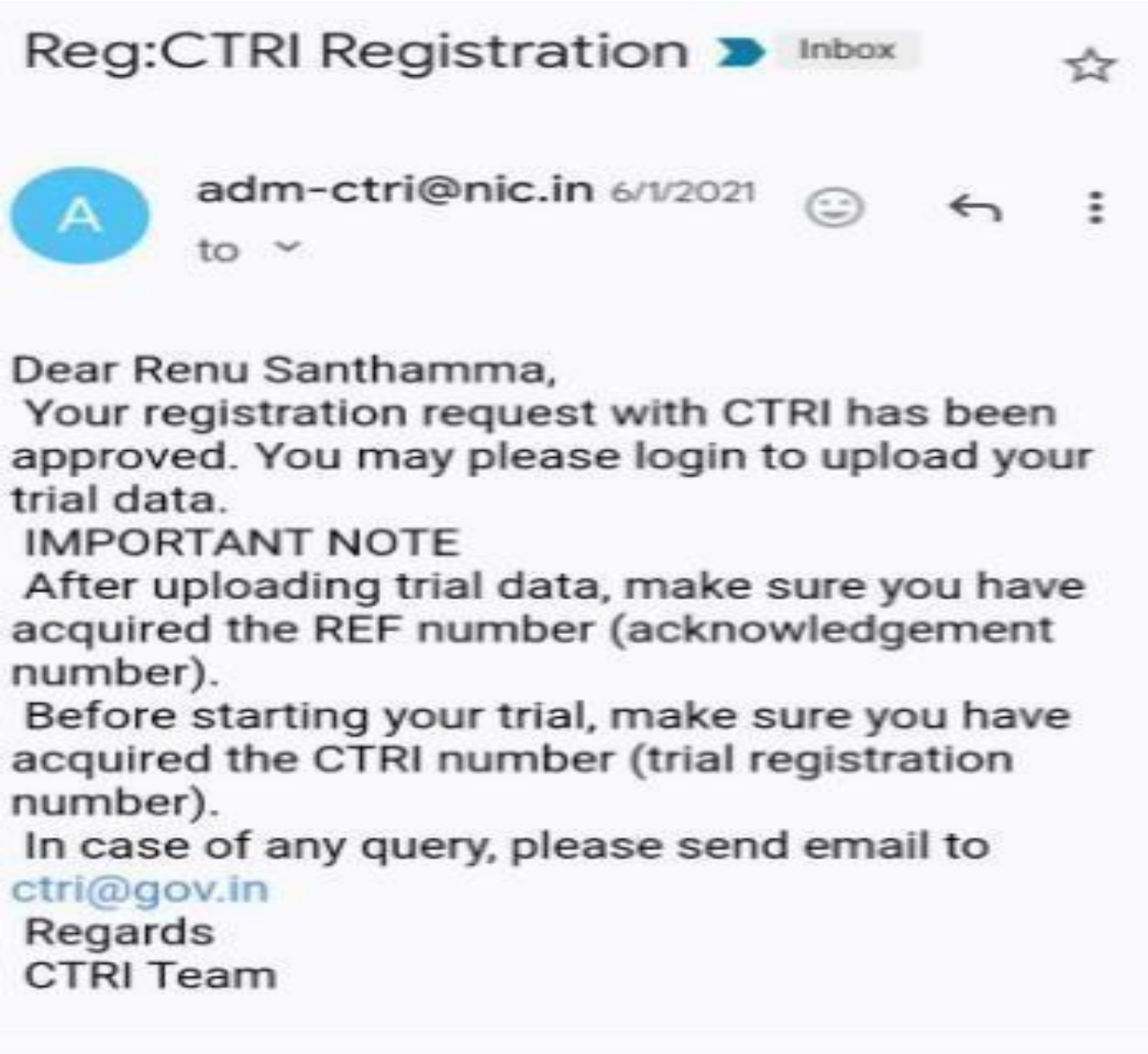
DR. LATHA. R

Signature and seal of Chairperson/Member Secretary

SECRETARY
Shri Sathya Sai Medical College & Research Institute,
Ammapettai - 603 108.

Ammapettai, Sembakkam post, Kancheepuram District – 603108. Phone: 044-27440760 Extn: 044-27440130

CTRI Mail Approval Letter



Reg:CTRI Registration Inbox

adm-ctri@nic.in 6/1/2021

to

Dear Renu Santhamma,

Your registration request with CTRI has been approved. You may please login to upload your trial data.

IMPORTANT NOTE

After uploading trial data, make sure you have acquired the REF number (acknowledgement number).

Before starting your trial, make sure you have acquired the CTRI number (trial registration number).

In case of any query, please send email to ctri@gov.in

Regards

CTRI Team

Data Collection Certificates

COLLEGE OF NURSING
Ananthapuri Hospitals and Research Institute
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Phone:0471-2506565,2506767,2579900
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Dr sreeja .I
Vice Principal &HOD of
Mental Health Nursing
College of Nursing
Ananthapuri Hospitals
&
Research center ,
Thiruvanathapuram .

Date : 18/10/24

The Registrar

Sri Balaji Vidyapeeth University

Pondicherry .

Respected sir,

Sub: Data Collection setting for PhD study of Ms Renu.S part time external Ph.d scholar UIN id 1905002007 reg :

With the reference above, Ms Renu.S, part time external Phd scholar under Sri Balaji Vidyapeeth University , has completed the data collection procedure under my supervision as Co- guide . The title of the research study is " **A true experimental study to assess the effectiveness of yoga on Academic stress, Biochemical and Bio physiological parameters among Adolescents"** . She completed data collection from 3 Government schools , 2 Aided and 2 private schools in Thiruvanathapuram District from July 2023 to December 2023 .

18/10/24

(Dr Sreeja .I)

Vice Principal

College of Nursing Ananthapuri Hospitals Date: Trivandrum

Dr. Sreeja .I Msc (N), Ph.D
Professor
Department of Mental Health Nursing
College of Nursing
Ananthapuri Hospitals and Research Institute
Chacka, Trivandrum

Effect of Counseling Assistance on Anxiety Related Depression Among Adolescents

S. Renu[1], Dr. Helen Shaji J. C[2], Dr. L. Sreeja[3]

[1]*Research Scholar, Department of Nursing, Sri Balaji Vidyapeeth University, India*
[2]*Professor, Research Supervisor, Dean, SRM College of Nursing, Faculty of Health and Medical Sciences, India*
[3] *Vice Principal, College of Nursing, Ananthapuri Hospitals & Research Institute, India*

KEYWORDS
Adolescents, Depression and Anxiety, Counselling.

ABSTRACT
Background: Adolescent depression and anxiety disorders are often associated with issues like low self-esteem, poor academic performance, interpersonal relationship difficulties, long-term mental health problems, substance abuse, and suicidal attempts. Nearly 3 million adolescents are struggling with depression and anxiety. Counselling is a process that helps individuals address and resolve their issues through various strategies and suggestions. Adolescent counselling can be an effective tool for overcoming depression and anxiety .it also intended to help adolescents make sense of their feelings and behavior.
Materials and Methods: This study was done on the effect of counseling in reducing anxiety and depression among adolescents. This prospective study was conducted among 60 higher secondary adolescents recruited from St Antony's higher secondary school through a convenient sampling technique. The standardized Beck's Anxiety and Depression Scales were used to assess depression and anxiety.
Results: In the study group, most of participants have moderate depression and anxiety before intervention which declined to minor depression and anxiety after 8th week of intervention. The mean pre-test anxiety score was 67.5 ± 11.5 which was decreased to 48 ± 9.5 after the intervention which was statistically significant.
Conclusion: This study recommends that counselling was effective in reducing anxiety and depression among adolescents.

1. Introduction

Adolescent is a periodthat involvestransition from childhood to adulthood in which considerable physical and mental changes take place it usually occurs between the age of 10 and 19 years.[1]. Physical change that occurs during that time is known as puberty. Because of puberty, the teenagers may often over – sensitive and lack of self-confidence they come to terms with the changes they are going through. Mood swings and shyness are some of the most features associated with adolescence. It is a period of vulnerability for the teenager, which requires support and understanding. [2]Depression and anxiety are recognized are significant mental health problems during childhood. [3] The prevalence of symptoms of anxiety and depression has been shown to increase during development. The prevalence of anxiety and depression increases with development, rising from around 1% in children under 12 to between 17% and 25% by the end of adolescence (Singh [4], Kamlesh; Junnarkar, Mohita; Sharma, Soumya, 2015). Anxiety and depression are associated with impaired social and school functioning and are predictive of similar problems in adulthood This problem significantly effect in performance of Academics and also lead to negative thought and suicide. The prevalence of anxiety and depression increases during adolescence, and the comorbidity between these diagnoses is high among young people. [5]The one-year prevalence rate of adolescent depression is estimated to be 5.6%. [6] Anxiety in young people if not diagnosed and treated can lead to severe debilitation. This can manifest itself in children and adolescents with poor school performance and often severe impairment of developmental milestones particularly those impacting on family and peer relationships

Young people, and particularly adolescents, with anxiety or depression, may adopt maladaptive coping strategies that only result in further complicating the course of their illness. (Warren Bartik, Nick Kowalenko, Kathy Whitefield and Ann Wignall2001) [7] Recently a comparative study was investigated on anxiety and depression among adolescents from rural and urban areas (Surya Prabha [8] V, Sakuntala Devi G, Venkateswara Rao B and Kanaka Bushanam March 2017). The study result depicted anxiety and depression are more in urban areas than in rural areas. Anxiety and depression are more prevalent in boys than in girls. [8] Upashree Dutta1 and K. ArockiaMaraichelvi(2020), mental health of a person mainly depend on coping skill to alleviate stress, depression and anxiety. Also, emphazise the academic pressure is the most influential factor which

leads to stress, depression, and Anxiety, OCD. [9] Susi RutmalemBangun (may 2022) group therapy is effective in reducing anxiety and depression among adolescents.[10] Cognitive behavioral therapy (CBT) is the most extensively tested intervention for adolescent depression.

Bernardo Nardi,Micaela Massei,Emidio ArimateaandAndrés Moltedo-Perfetti 2016). [11] Adolescent Counseling is intended to help adolescents make sense of their feeling and behavior. Approaches such as family provide both parent and teenagers with the chance of exploring their relationship and ventilating their feeling in a supporting environment. [12] Counseling offers adolescent a chance to ventilate their feelings to counselor. it also suitable for adolescent who are suffering from mild and moderate symptoms of anxiety and depression [13]. Asli kartol (2019) investigated group counseling based on rational motivational therapy is very effective in reducing anxiety and depression. [14]

Another study shown student counseling helps to reduce in levels of anxiety and depression among children and adolescents in Saudi schools [3]. (Turki Alotaibi 2015) [15]. Hence school-based counseling helps to identify the mental health issues and provide adequate support to get rid of these problems among adolescents. This study aims to intend on effect of counseling on Anxiety and depression among Adolescents.

1.1. Objectives:

1. To assess the level of anxiety and depression among adolescent before counselling.
2. To assess the level of anxiety and depression among adolescent after counseling.
3. To compare the level of anxiety and depression among adolescent.

1.2. Hypothesis:

- H_1: There will be significant change in the mean scores of anxieties and depression among adolescents after intervention.

2. Materials and Methods

In this quasi-experimental study one group pretest post-test design was used. Study group consists of 60 adolescents from a government aided school from Thiruvananthapuram district. Students with history of mental illness were excluded. Malayalam version of Beck's Depression and Anxiety Inventory was used. Reliability coefficient as given by Cronbach's alpha was 0.712 for this tool. For the conduct of study permission from Institution Ethical Committee (EC /01 / 2020) was obtained. In the first phase all the students were interviewed and their anxiety and depression levels were measured. They were exposed to four counselling sessions of 45 minutes duration on alternate weeks. To measure the effect of intervention on the levels of anxiety and depression the adolescents were interviewed again on the ninth week following intervention. Qualitative variables were expressed as frequency and percentage and quantitative variables were expressed as mean ±SD. To study the effect of intervention paired t test was used.

3. Results

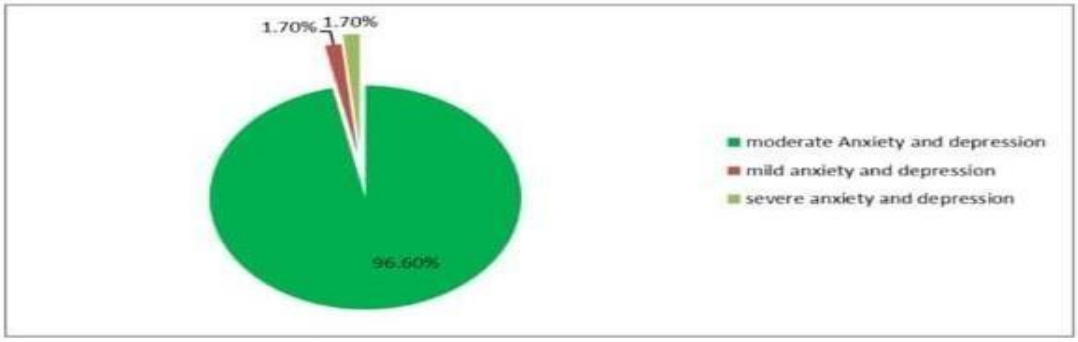

Figure 1: Percentage distribution of anxiety and depression before Counseling

Figure 1 shows the percentages of anxiety and depression levels before counseling. The majority of participants (96.6%) experienced moderate anxiety and depression, while only 1.7% had mild anxiety and depression, and another 1.7% had severe anxiety and depression prior to the intervention.

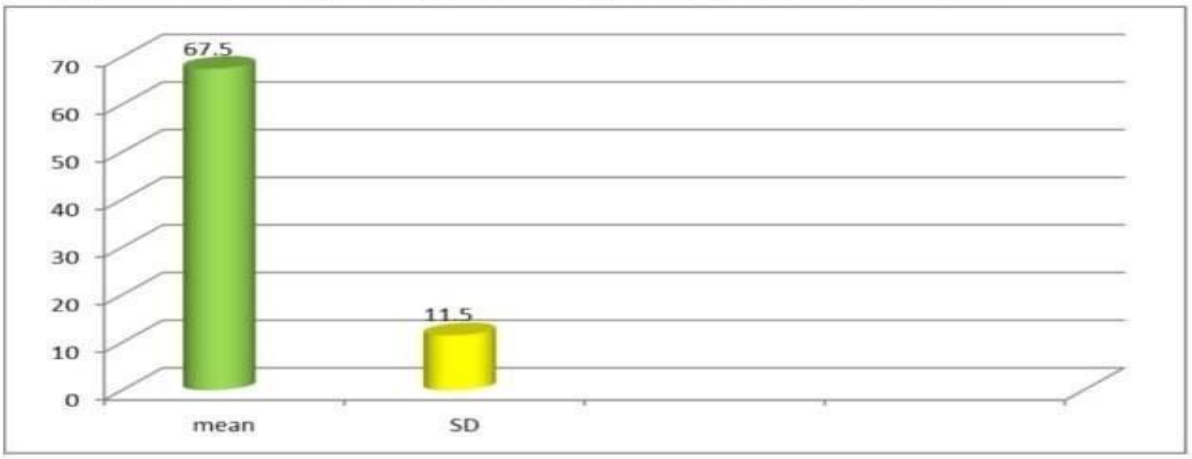

Figure2: Mean scores of anxiety and depression of participants before intervention

Figure 2 illustrates the mean levels of anxiety and depression among participants before the intervention, which was 67.5 ± 11.5. The estimated population mean, at a 95% confidence interval (CI), ranges from 64.5 to 70.7.

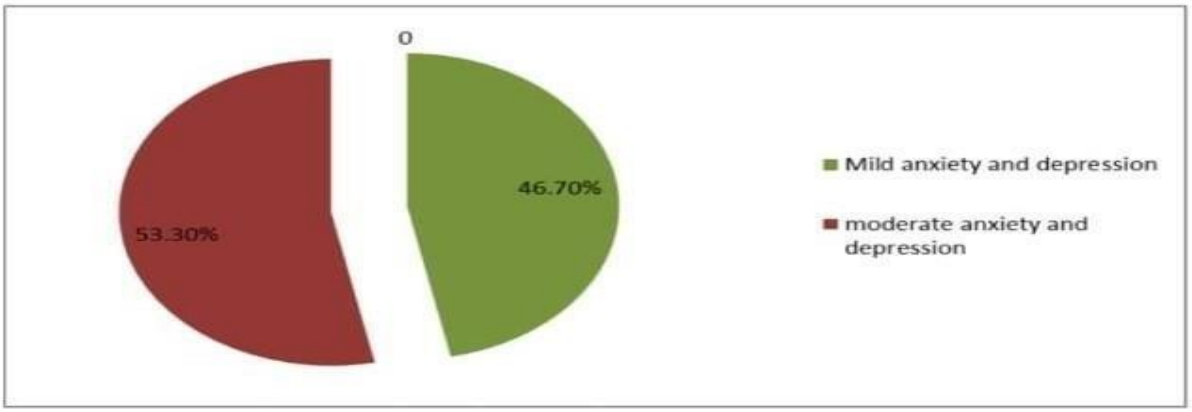

Figure 3: Percentage distribution of Anxiety and depression after counseling

Figure 3 shows the percentage of participants' anxiety and depression levels after counselling. It was observed that 53.3% of participants experienced mild anxiety and depression, while 46.7% had moderate anxiety and depression. Notably, no participants remained in the severe anxiety and depression category after the nine-week intervention.

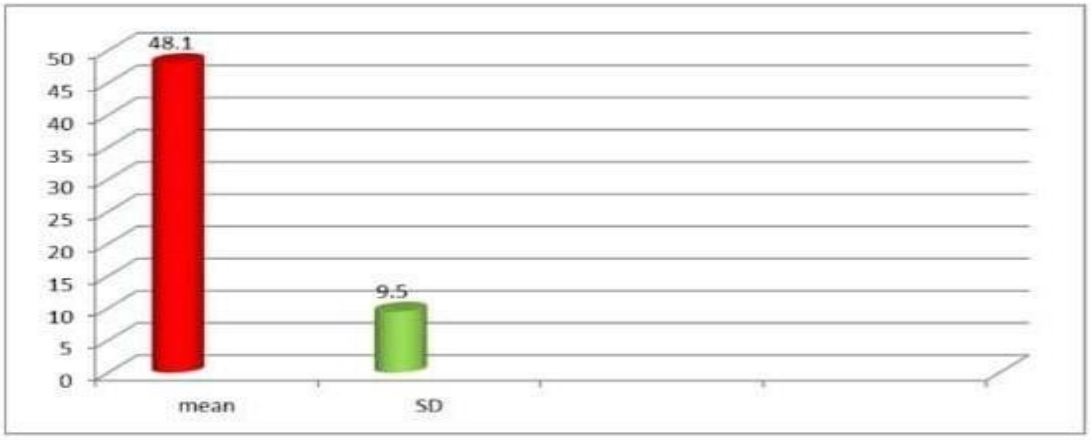

Figure 4: Mean Scores of anxiety and depression of participant after counseling

Figure 4 presents the mean anxiety and depression scores of participants after counselling. The mean scores decreased to 48.1 ± 9.5 following the counselling sessions. The estimated population mean, at a 95% confidence interval (CI), ranges from 45.7 to 50.5.

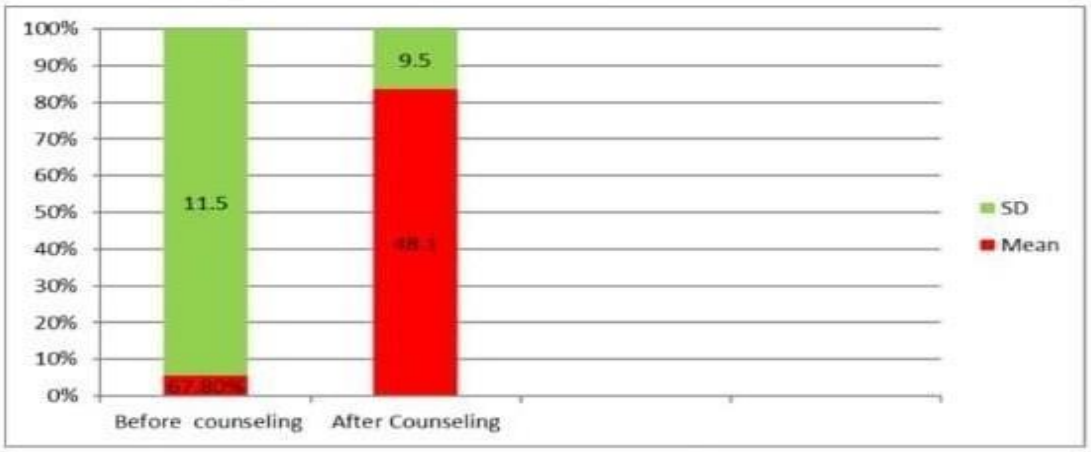

Figure 5: Comparison of Anxiety and depression before and after counseling

Figure 5 portrays the mean scores of anxiety and depression of the adolescent were 67 .5 ± 11.6 at baseline reduced to 48.1 ±9.5 after 9 th week of intervention which was statistically significant at level of p<0.001. Thisresults suggest counseling is effective in reducing anxiety and depression among adolescents.

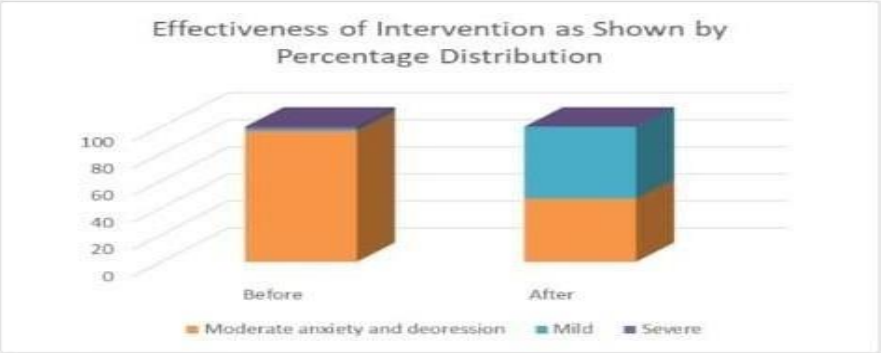

Figure 6: Effectiveness of counseling according to categorization

Figure 6 illustrates the effectiveness of counselling across three categories. The study reports that 1.7% of participants had mild anxiety and depression at baseline, which increased to 46.7% after nine weeks of intervention. Additionally, 96.6% of participants had moderate anxiety and depression before the intervention, which decreased to 53.3% after counselling. These changes in mean scores were statistically significant ($p<0.001$). The research hypothesis of intervention bringing in change in mean scores was accepted.

4. Discussion

Using Beck's Depression and Anxiety Inventory, the study demonstrates that 1.7% had mild and another 1.7% had moderate levels of anxiety and depression. The mean anxiety and depression score of female adolescents was 16.7± 4.5 before counselling session and was declined to 12.7 ±9.3 after ninth week of intervention.

A similar study by Shiri [16]et al among female adolescent also demonstrate the effect of counselling on anxiety and depression besides quality of life as measured using WHO QOL questionnaire. Mean (SD) score of participants' anxiety before the intervention was 16.7 (4.8) which was significantly reduced immediately after the intervention to 12.7 (9.3) and 8 weeks after intervention to12.8 (8.7). Mean (SD) depression score in participants before the intervention was 17.0 (11.5) which immediately after the intervention dropped to 11.0 (10.4)) and 8 weeks after the end of the intervention, it was significantly reduced to 12.7 (11.0). Mean (SD) score of overall quality of life before the intervention was 67.2 (14.8) which increased significantly immediately after the intervention to 71.1 (16.3) and 8 weeks later to 71.9 (14.6).

A study by Johan [17]et al also demonstrates expressive art therapy in group counselling sessions as an intervention can be effective in anger management. Similar results are obtained in a quasi experimental study by Bakesia[18] andAbwalaba(2023) conducted in schools of Kenya. The mean depression score was 28.0±2.7 before intervention which was reduced to 21.0±6.6.A combination of guidance and counselling was used as intervention and yielded an effect size of 0.46. A meta-analysis covering randomized clinical trails,after accounting for publication bias, school-based interventions demonstrated a significant positive effect on reducing symptoms of depression and anxiety compared to control groups Zhang Q[19] wang Jand Neitzel A(2023).

The question of whether educational institutions can serve as settings for offering counseling services is frequently encountered. To provide early and accessible treatment for adolescents with depression, brief and effective treatments in their everyday surroundings are essential. Apart from ensuring confidentiality from society, this setting reduces the fear of counselors. It also ensures lower costs and saves time, offering flexibility in sessions and financial savings. School counselors can collaborate with teachers and staff to provide a more holistic support system for students. This integrated approach ensures that both academic and emotional needs are addressed, leading to better outcomes for students. This approach is supported by a multi-stakeholder analysis by Parikh[20] et al exploring priorities and preferences for school mental health services in

urban India revealed a consensus across all stakeholder groups that schools are a suitable platform for delivering mental health services. Different groups valued different outcomes: adolescents prioritized stress reduction related to coping with life's challenges; parents and teachers focused on functional outcomes, particularly academic performance; and mental health providers emphasized addressing more overt psychiatric symptoms.

5. Limitations

There are certain limitations to consider when interpreting the results of this study. Since a quasi-experimental method was adopted, the absence of a control group affects the ability to demonstrate the intervention's effectiveness. Additionally, participants were subjected to only a limited number of counseling sessions due to their busy examination schedules. The intervention was also conducted with a small number of participants, which limits the ability to generalize the findings. Future studies should incorporate objective measurements of neurotransmitters to better assess anxiety and depression among adolescents.

6. Conclusion

Adolescence is a particularly sensitive period marked by significant social, physical, and emotional changes, making it a critical time for the onset of mental and emotional issues. During this time, many young people experience increased vulnerability to mental health issues, particularly anxiety and depression. The prevalence of these conditions in adolescents is a growing concern worldwide, with potentially severe implications for academic performance, social relationships, and long-term mental health outcomes. Our study findings clearly indicate that counseling effectively reduces anxiety and depression in adolescents. Implementing counseling services within the school system offers a natural and accessible means to support adolescents in distress. Therefore, the author recommends that school-based counseling be periodically implemented as a preventive measure to address mental health problems among adolescents, who are the future pillars of our nation.

7. Acknowledgement

The author expresses gratitude to all the students, teachers, principal, and other non-teaching staff for their cooperation in completing the study.

8. Key Findings and Implications

Symptom Reduction: The study observed a statistically significant decrease in anxiety and depression scores after counselling interventions. The mean scores dropped from 67.8 ± 11.5 before intervention to 48 ± 19.5 after 9 weeks of counselling ($p<0.001$). This substantial reduction underscores the potential of counselling as an effective tool for addressing adolescent mental health concerns.

Severity Shift: A notable finding was the complete elimination of severe cases post-intervention. The proportion of participants with mild symptoms increased from 1.7% to 53.3%, while those with moderate symptoms decreased from 96.6% to 46.7%. This shift towards milder symptomatology is clinically significant, suggesting that counselling can not only alleviate symptoms but potentially prevent the escalation of mental health issues in adolescents.

School-Based Intervention: The study's setting in a school environment highlights the feasibility and potential efficacy of integrating mental health support into educational settings. This approach could be particularly valuable for early intervention and prevention, potentially reaching a broader range of adolescents who might not otherwise access mental health services.

Short-Term Effectiveness: The positive results observed after just 9 weeks of intervention suggest that even relatively brief counselling programs can yield meaningful improvements in adolescent mental health. This finding has important implications for resource allocation and program design in school-based mental health initiatives.

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South Eastern European Journal of Public Health

Jan 08, 2025
ID: SEEJPH-7339

Letter of Acceptance

Dear Authors:

Renu.S, Prof.Dr. Helen Shaji J. C, Dr. Sreeja. I

It is a great pleasure to inform you that your article titled "**A Descriptive Survey On Academic Stress Among Adolescents In Selected Higher Secondary School**" has been accepted for publication in "**South EasternEuropean Journal of PublicHealth"ISSN: 2197-5248.**

Author Consent For using Tool

Gmail - Fwd: Permission regarding Academic Scale file:///C:/Users/user/Desktop/Gmail - Fwd_ Permission regarding Acade...

Gmail RAJESH UR <rajeshur77@gmail.com>

Fwd: Permission regarding Academic Scale
1 message

Renu Santhamma <renusanthamma@gmail.com> Mon, Mar 23, 2020 at 1:02 PM
To: RAJESH UR <rajeshur77@gmail.com>

---------- Forwarded message ---------
From: **Renu Santhamma** <renusanthamma@gmail.com>
Date: Mon, Mar 23, 2020 at 2:31 PM
Subject: Re: Permission regarding Academic Scale
To: BALAJI RAO RAJA <balajirao1972@gmail.com>

Thanks for giving permission to use this scale sir

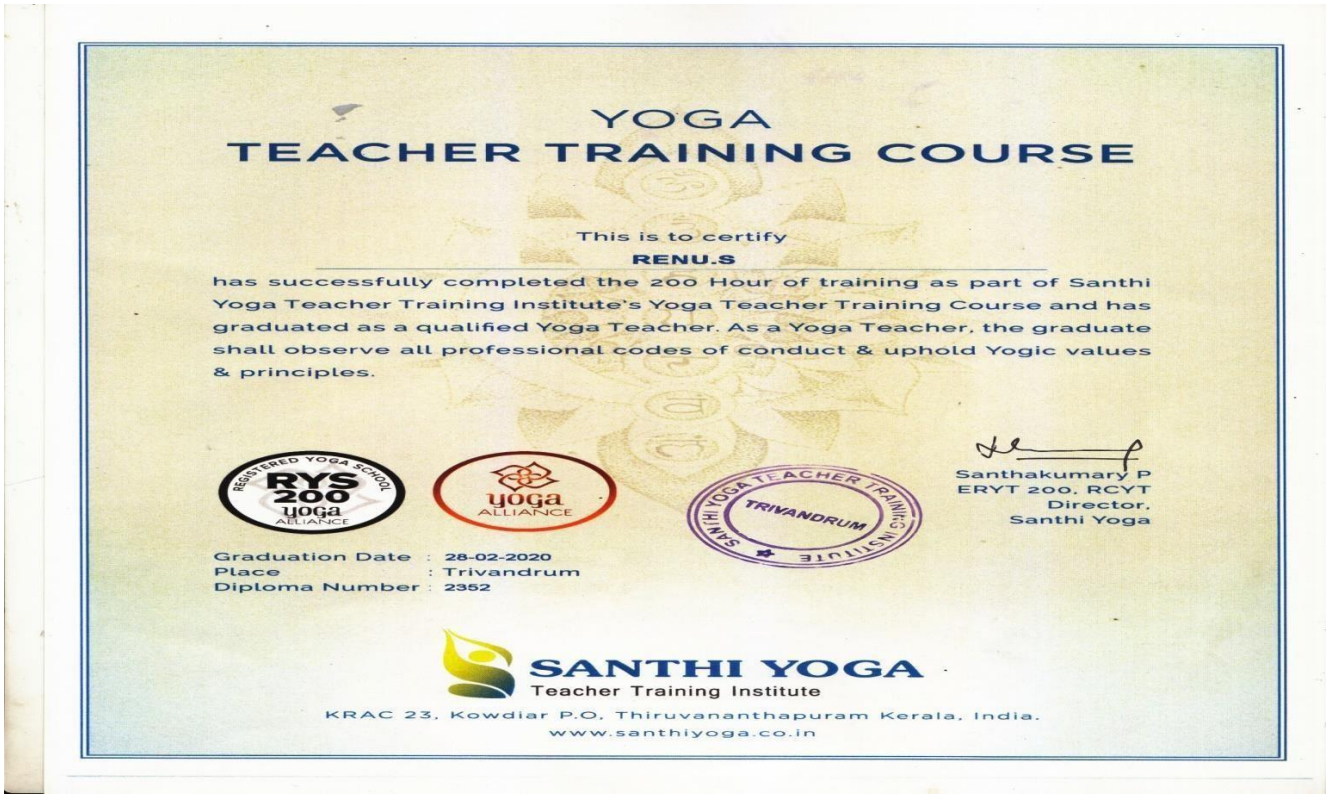
On Mon, Mar 23, 2020 at 2:32 PM BALAJI RAO RAJA <balajirao1972@gmail.com> wrote:
Received your mail.

On Mon, 23 Mar 2020, 12:56 pm Renu Santhamma,

Permission has been given to you for using Academic Stress Scale
Dr. RAJA BALAJI RAO
LECTURER DIET PALLIPADU SPSR n
Nellore district
9652846946

3/23/2020 1:12 PM

Yoga Training certificate



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This is to certify
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has successfully completed the 200 Hour of training as part of Santhi Yoga Teacher Training Institute's Yoga Teacher Training Course and has graduated as a qualified Yoga Teacher. As a Yoga Teacher, the graduate shall observe all professional codes of conduct & uphold Yogic values & principles.

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Santhakumary P
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Director,
Santhi Yoga

Graduation Date : 28-02-2020
Place : Trivandrum
Diploma Number : 2352

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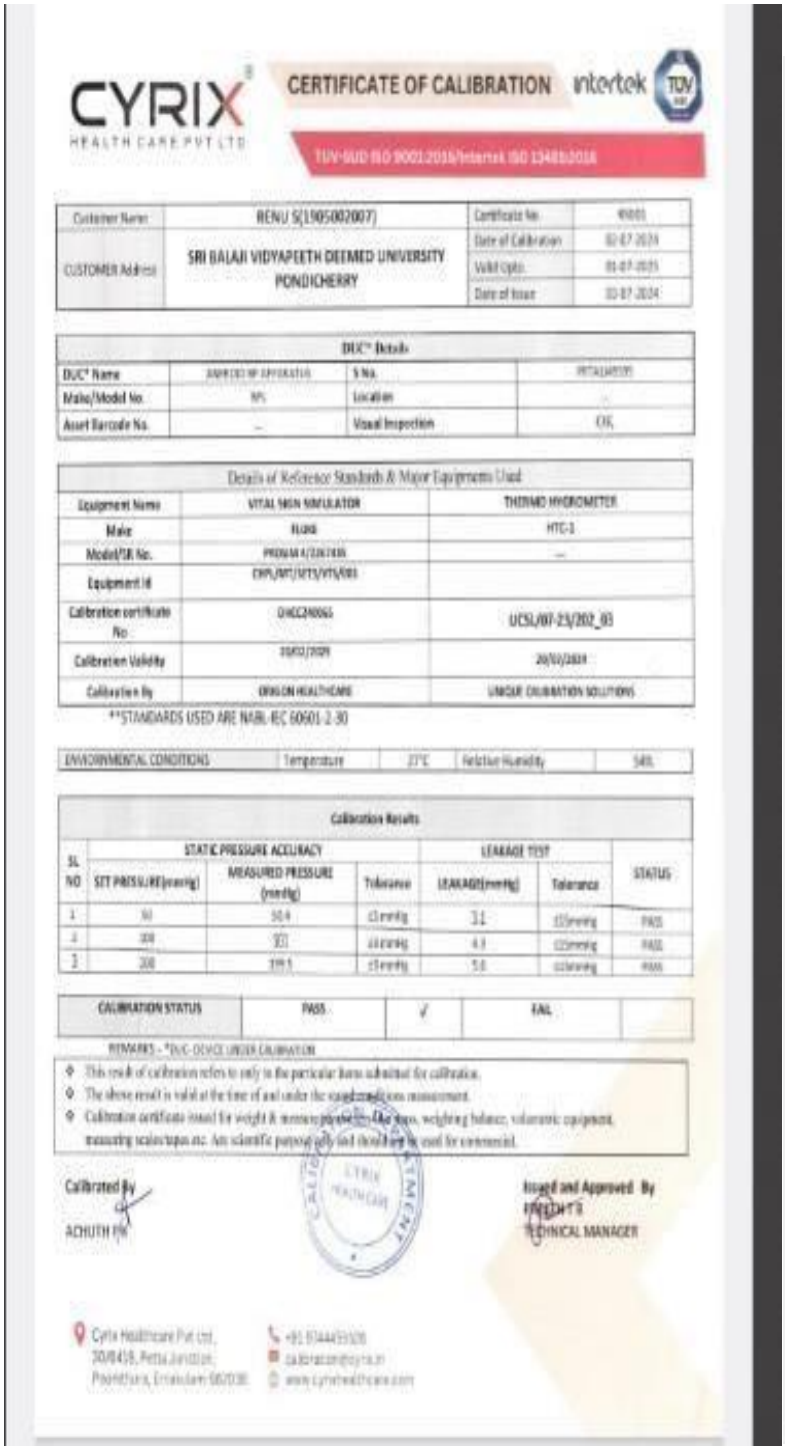
Calibration certificates



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DUC* Name	[illegible]	S No.	[illegible]
Make/Model No.	NIL	Location	--
Asset Barcode No.	--	Visual Inspection	OK

Details of Reference Standards & Major Equipments Used		
Equipment Name	VITAL SIGN SIMULATOR	THERMO HYDROMETER
Make	FLUKE	HTC-1
Model/SR No.	PROSIM 4 /2267035	--
Equipment Id	CVPL/BT/VTS/VTS/001	
Calibration certificate No	CHCC24006S	UCSL/07-23/202_03
Calibration Validity	03/02/2025	20/02/2024
Calibration By	ORIGIN HEALTHCARE	UNIQUE CALIBRATION SOLUTIONS

**STANDARDS USED ARE NABL-IEC 60601-2-30

ENVIRONMENTAL CONDITIONS	Temperature	27°C	Relative Humidity	54%

Calibration Results

SL NO	STATIC PRESSURE ACCURACY			LEAKAGE TEST		STATUS
	SET PRESSURE(mmHg)	MEASURED PRESSURE (mmHg)	Tolerance	LEAKAGE(mmHg)	Tolerance	
1	50	50.4	±2mmHg	3.1	≤5mmHg	PASS
2	100	101	±3mmHg	4.3	≤5mmHg	PASS
3	200	199.5	±5mmHg	5.0	≤5mmHg	PASS

CALIBRATION STATUS	PASS	√	FAIL	

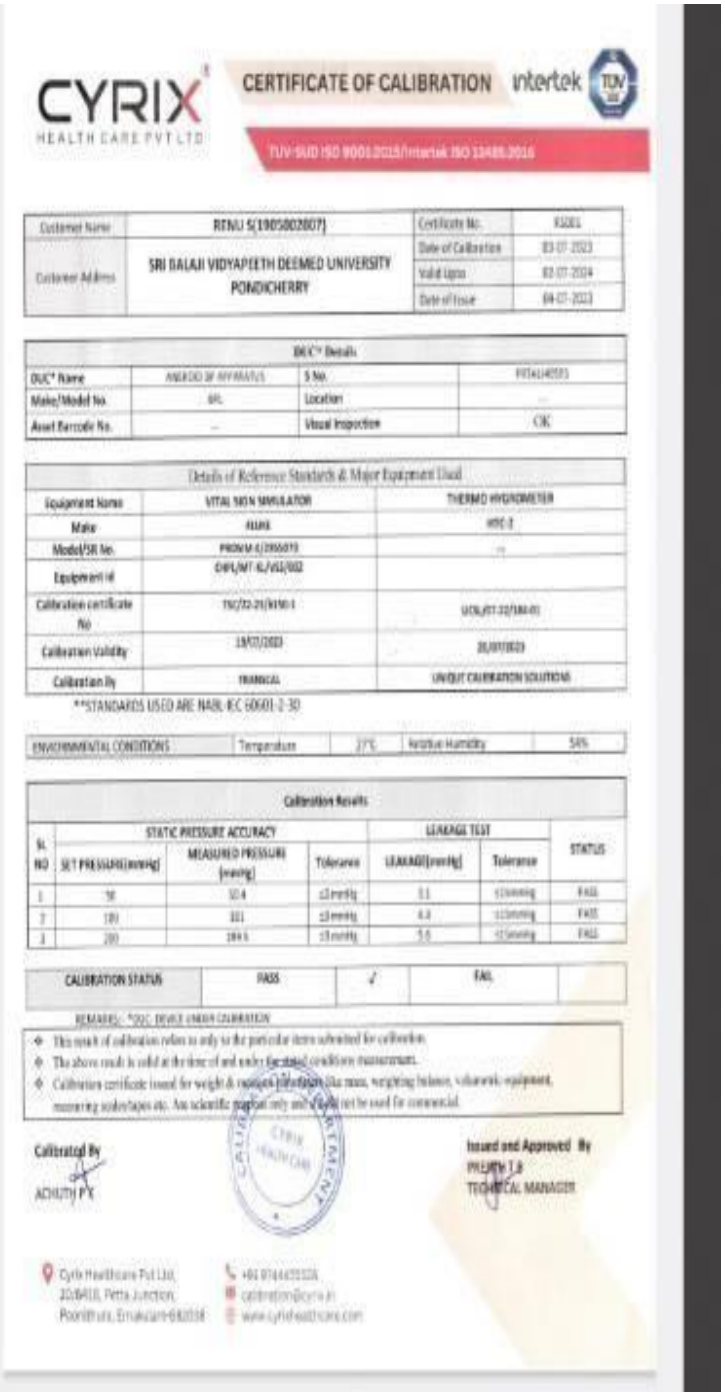
REMARKS - *DUC- DEVICE UNDER CALIBRATION

- This result of calibration refers to only to the particular items submitted for calibration.
- The above result is valid at the time of and under the stated conditions measurement.
- Calibration certificate issued for weight & measuring parameters like mass, weighing balance, volumetric equipment, measuring scales/tapes etc. Are scientific purpose only and should not be used for commercial.

Calibrated By
ACHUTH P.V

Issued and Approved By
PRIJITH T.B
TECHNICAL MANAGER

Cyrix Healthcare Pvt Ltd,
20/8418, Petta Junction,
Poonithura, Ernakulam 682038
+91 9744455528
calibration@cyrix.in
www.cyrixhealthcare.com



CYRIX
HEALTH CARE PVT LTD

CERTIFICATE OF CALIBRATION intertek

TUV-SUD ISO 9001:2015/Intertek ISO 13485:2016

Customer Name	RENU S(1905802007)	Certificate No.	[illegible]
Customer Address	SRI BALAJI VIDYAPEETH DEEMED UNIVERSITY PONDICHERRY	Date of Calibration	03-07-2023
		Valid Upto	02-07-2024
		Date of Issue	04-07-2023

DUC* Details			
DUC* Name	[illegible]	S No.	[illegible]
Make/Model No.	NIL	Location	--
Asset Barcode No.	--	Visual Inspection	OK

Details of Reference Standards & Major Equipment Used		
Equipment Name	VITAL SIGN SIMULATOR	THERMO HYDROMETER
Make	FLUKE	HTC-1
Model/SR No.	PROSIM 4 /2267035	--
Equipment Id	CVPL/BT-4/VS1/002	
Calibration certificate No	TSC/22-23/[illegible]	UCSL/07-22/[illegible]
Calibration Validity	19/07/2023	20/07/2023
Calibration By	TRANSCAL	UNIQUE CALIBRATION SOLUTIONS

**STANDARDS USED ARE NABL-IEC 60601-2-30

ENVIRONMENTAL CONDITIONS	Temperature	27°C	Relative Humidity	54%

Calibration Results

SL NO	STATIC PRESSURE ACCURACY			LEAKAGE TEST		STATUS
	SET PRESSURE(mmHg)	MEASURED PRESSURE (mmHg)	Tolerance	LEAKAGE(mmHg)	Tolerance	
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REMARKS - *DUC- DEVICE UNDER CALIBRATION

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Calibrated By
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PRIJITH T.B
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calibration@cyrix.in
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Certificates From Directorate of Higher Education

Office of the General Education Department, Higher Secondary Wing, Housing Board Building, Shanthi Nagar, Trivandrum.
0471-2323198, email-dhsed@gmail.com

No.Acd/ spc(4)/223571/2021/HSE

Dated: 22.12.21

Circular

Sub: General Education – Higher Secondary – Granting permission to conduct Ph D Study in selected higher secondary schools of Thiruvananthapuram District.

Ref: Lr.No. T.R.C-1/6511/2021/HSE , Dated 26.11.2021 of the Regional Deputy Director, Trivandrum

As per the reference cited above, Smt.Renu.S, Research Scholar has applied through the Regional Deputy Director, Thiruvananthapuram, for getting permission to collect data as part of her Ph D Study from the students of selected Higher Secondary Schools of Thiruvananthapuram District. Permission is granted for the same on the grounds that confidentiality should be maintained throughout the study and also during publication. The Research Scholar should seek the permission of Principals of concerned Schools to get convenient date and time for the study.

Joint Director (Academic)

To,

1. Smt.Renu.S
   Research Scholar,
   Sri Balaji Vidhyapeeth Deemed University,
   Pondicherry
2. Principals of Higher Secondary
   Schools in Thiruvananthapuram District.